



FRIDAY, FEBRUARY 28, 1879.

Contributions.

Hand-Car Used on Philadelphia & Reading Railroad.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I noticed in your valuable paper of Dec. 13, 1878, a cut and description of Mr. Bagaley's "Quadricycle." The article concludes by stating that he has applied for a patent. Inclosed please find tracing of what is known on the Philadelphia & Reading as a "lever." It was designed for the Philadelphia & Reading in 1848, by Samuel Romans, who is now living in Columbus, O. The machines were built at the Pottstown shops, and have been used ever since by track bosses. They have 48-in. drivers, 18-in. truck-wheels, and weigh 360 lbs. and will carry three persons, and can make 8 miles an hour without much exertion. The only difference between the "lever" and "quadricycle" is the position of the fulcrum. The lever fulcrums at one end; the quadricycle fulcrums in the centre. The spokes of the wheels of the lever are made of iron pipe; on the quadricycle they are made of wood. In 1863 M. W. Baldwin & Co. built and shipped six for Cuba and Panama; those sent to Panama were to be used on the Panama Railroad. They were copied from the Philadelphia & Reading lever known as "Old Grimes," that used to run ahead of passenger trains from Broad and Callowhill streets to Fairmount Park, to give warning at the street-crossings. So you see, Mr. Editor, "there is nothing new under the sun." Hoping you will find room for this sketch in your much-read paper, I am

Very sincerely yours,
STUB BRASS.

The Latest Fraud with Letter-Heads.

CHICAGO, Ill., Feb. 19, 1879.
TO THE EDITOR OF THE RAILROAD GAZETTE:

Frequent circulars from the officers of railroad companies give notice of frauds upon them by counterfeits of letter-heads and office stamps, used in making applications for passes.

Another fraud of this kind is found alarmingly prevalent in the use of similar counterfeits for letters recommending men who have not been in any railroad employ, as old brakemen or freight conductors or some other kind of employes.

I am informed that such a letter successfully imposes upon a kind-hearted passenger conductor, who swallows the appeal of the swindler and carries him over a division or two, fully believing him to be an impecunious railroad man. In such cases, not only the railroad company but the conductor is swindled; and, having discovered this trick, I give notice to other railroad men that they may be on the lookout.

A letter, or a name signed to a letter of recommendation, even if it appears to be stamped with an official stamp, is of no sort of value unless the hand-writing is familiar. I have seen several specimens that would deceive anybody, except he knew the hand-writing of the persons by whom they purport to have been signed.

I. OPENER.

The Boston & Albany Engine.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see in your issue of the 14th instant a letter from one signing himself "Springfield," giving a description of engines being constructed by the Boston & Albany Railroad under the direction of Mr. Eddy, Master Mechanic at Springfield. As this letter was evidently written to invite criticism of the special points in the construction of the engines in question, I venture to disagree with some of the views expressed therein.

The distinctive features of these engines, if I understand them rightly, are:

- First—A very wide and short fire-box.
- Second—Straight boilers, without domes or "wagon-tops."
- Third—Very small steam-ports in cylinders.
- Fourth—Very large cylinders in proportion to the weight on the driving wheels.
- Fifth—Greater weight per driving wheel than is usually allowed.

The advantages claimed for this engine are:

- First—Low cost of maintenance.
- Second—Economy in the use of fuel.
- Third—Greater tractive force than is obtained by any other methods, with no greater damage to the track.

So much for the claims made for the "Eddy" engine. To support these claims, a description of a part of the details of the construction of the engine is given, and the same are certainly of a kind at variance with what all engine-builders of late years have taught were the correct principles. The tendency of all builders, for the past five or ten years, has been to get as much iron into one piece as is possible, and to avoid, as far as possible, all bolts in frames, and to avoid riveting entirely. All of the details mentioned are such as to cause doubt that these engines fill the first advantage claimed—"low cost of maintenance;" and the "scientific public," who are interested, would like some statistics showing the cost for tonnage mileage before admitting the claim.

The second claim of "economy in the use of fuel," does not seem to be supported by any data given, as the statement does not give any information of the pounds of coal used per mile run; of the water evaporated per pound of coal, or the foot-pounds of energy developed by one pound of coal; but instead of this, it gives a statement that one of the engines of this class, in a trial with a "Mogul" had drawn the same train with \$600.11 worth of fuel, while the cost of fuel for the "Mogul" was \$790.54.

The "scientific public," judging from another statement in regard to the "Mogul" (that is, that "changing the ports to 10 in. \times 1 $\frac{1}{4}$ in. has diminished her expenses six cents per mile"), would be liable to think that possibly the "Mogul" was not a very good engine, and that to do the work for some 23 per cent. less was not so great a feat after all.

Again there cannot be any justice in charging the "Eddy" engine \$6.80 per ton for fuel, and the Mogul \$7.02 per ton in the same trial.

Concerning the third advantage claimed, as this is supported only by the expectation of what Mr. Dudley's dynamometer

mile," etc., and as we are left entirely in the dark as to what the cost per mile is, we are unable to judge whether—even with the saving of two cents per mile—the cost is not altogether too great.

It would be interesting to know if, when the ports were changed on these engines, there was any other work done on them, and especially if the tubes were reset and scale cleaned from the side of the fire-box, etc.

Unless "Springfield" gives more proof of the advantages claimed for the "Eddy" engine than he has done, railway managers will hardly consent to throw away their present types of engines to adopt the "Eddy." "W."

FEB. 17, 1879.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I get a great deal of valuable information weekly from your columns, and read with care most, if not all, the articles that appear from time to time, on improvements in design and economy in operating the modern locomotive. Being aware that, with all the improvements that have been made, the locomotive of to-day is still a wasteful machine, that leads me to make some reflections on Springfield's article, in your last number. He starts off with what appears to him to be an admitted fact: the Springfield's engines have marked superiority, both as regards tractive force and economy in the consumption of fuel, and that these points were generally understood, because they beat two engines of other builders, which, it will be safe to say, were away from the fostering care of designer and builder. He then gives a detailed statement of the general dimensions of what he is pleased to term "two monster freight engines of 40 tons weight," which is two tons less than several of the passenger engines weigh on a road less than two hundred miles from Springfield. He says the big "economical" point seems to be the small ports, or, as we call it, the short ports. We will take the Tennessee's figures, and see if there is not some bigger economical point than the short ports. Her dimensions are: Diameter of cylinder, 18 $\frac{3}{4}$ in., the area of which is 276 square inches; stroke, 28 in.; driving-wheels, 55 in. The valves have $\frac{5}{8}$ outside lap, and, if I understand him correctly, about $\frac{1}{8}$ inch lead on exhaust. The throttle port is given as 6 \times 1 $\frac{1}{2}$ in., which gives an opening of 9 square inches, or less than half the diameter of the cylinder. Now, what I want to know is, Where is the economy of contracting a 6-in. dry-pipe with an area of 28 $\frac{1}{4}$ in. at the discharge end to 9 in.? Is it to be understood that the average pressure is greater after being wire-drawn through the first contracted passage—that the pressure is raised still higher by passing through ports whose average opening when working with an ordinary train will not exceed 1 inch by 8 or 9 in. length? If this constant reduction of port-opening is the "big thing" which is claimed, why not make a bigger

economical point by making the ports 4 $\frac{1}{2}$ in. long, and do away with long and heavy valves and connections? If these ports are what are claimed for them, it upsets one of the first principles of mechanics—that the larger the opening the greater the volume that can be admitted in the same length of time. But, to be practical about the matter, if there is the great excess of power which Springfield claims, I think he is looking in the wrong place for it. If he will take the area of the pistons and the long leverage, to say nothing of the economy of the expansion with the 28-in. stroke, and the great amount of inside lap which he must have, if I understand his figures, and will take one of the balanced throttle-valves with double openings, which are used on many roads with openings equal to the area of the dry-pipe, he can put his throttle in the dome and lengthen his ports to 16 in. or more, with as good, if not better results, which can be determined by Dynagraph Engineer Dudley, when he will not have to stand holding the sand-lever to keep the monster to the frosty rails, as at this season.

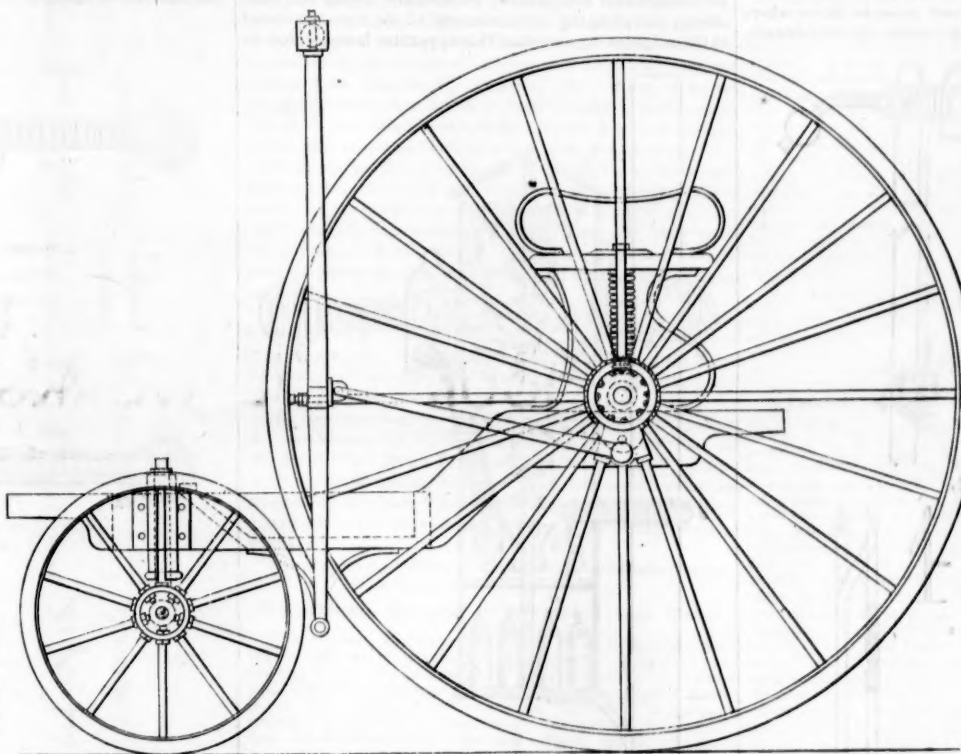
A READER.

What Safety Chains Have Done.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Much has been said about safety chains connecting body and trucks of freight cars; the railway companies who use them, it is to be supposed, will advocate their use, and to tell your readers that they are useful at times, I will state some facts as they occurred on this line.

On the 16th of January, 1879, a train of thirty odd cars loaded with stock passed the trackmen, and, as it passed, one of the men noticed a wheel gone from one end of an axle under one of the stock cars. The men hastened to the first station and telegraphed to Hamburg to stop that train; the train was stopped at Hamburg, to discover one wheel gone entirely. The wheel had split in two parts and



HAND CAR USED ON PHILADELPHIA & READING RAILROAD.

was thrown out. It was found five and a half miles west of Hamburg. The axle from which the wheel was gone was running cool and good in the box, the box being held in position by the safety chains. To this incident there is a moral: Give the trackmen orders to watch the trucks of every train that passes them.

On the 31st of January, 1879, a freight train was proceeding west on this line, when a suspension hanger in the swing-motion truck broke under the first car in the train, and the bolster fell to the ground. The second and third were Boston & Albany cars, and, not having any truck plank below the axle, the bolster broke the brake-beams under these cars; the fourth was a Lake Shore & Michigan Southern car with a truck plank across connecting the two side frames; this being below the axle, the fallen bolster struck it toward one end, lifting that end of the truck with one pair of wheels off the track, and was thrown out from between the rails. The safety chains held that pair of wheels that were off the track close to the rails and also prevented the other pair of wheels in that truck from getting off the rails. This occurred about one and a half miles from the station where this train stopped. There is every reason to suppose that had the regular stopping-place of this train been farther than a mile and a half from where the bolster dropped, the train would have made the distance before such condition was discovered.

Swing-motion trucks under a car are valuable, but should be kept in good condition.

JOHN KIRBY.

The Paris Exhibition—France—Electricity in Railroad Engineering Continued.

(Continued from page 95.)

TO THE EDITOR OF THE RAILROAD GAZETTE:

Between the principal semaphore posts, in places where the approach of a train ought to be announced—for instance,

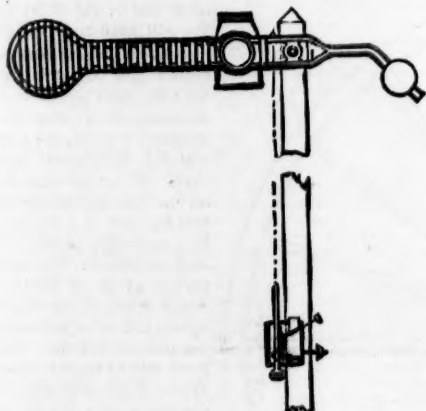


Fig. 12.

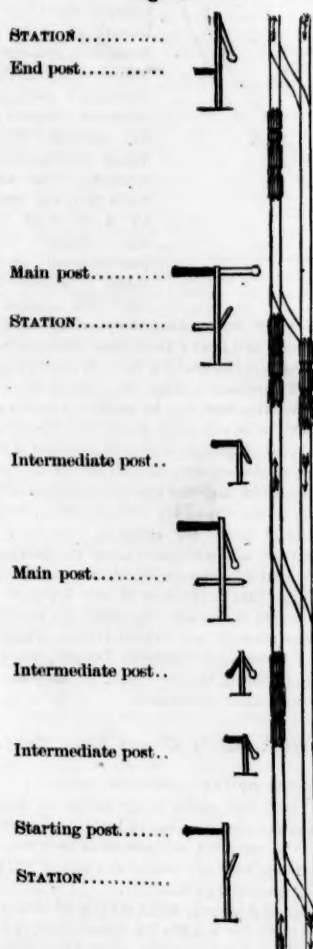


Fig. 13.

on level crossings—an apparatus like that shown in fig. 12 can be easily introduced in the system, which by the fall of its arm and a stroke on the bell would announce the depar-

ture of a train from the antecedent post; as soon as the train has passed this intermediate post, the guard moves the signal back again to the former position.

Fig. 13 represents the various relative positions between the signals and trains on a double-track road.

Should it be required that the signals in their normal position should shew danger, this can be accomplished by equalizing the arms with counter-weights, and by liberating, through the current from the subsequent post, not the arms, but certain levers, which lock the arms; the arms would then still remain horizontal and could be placed vertically by hand, by the attendant, when a train approached; they could not be moved, however, until the levers had first been liberated. Various other dispositions can also be effected to suit different ways of working the block system.

It may happen that on special occasions a great number of trains must be dispatched in a comparatively short time; the block sections, which divide the line, ought then be shortened, and new, temporary signal-posts, in addition to the permanent posts, be introduced. The Northern Railroad has adopted for this purpose a system of double electric bells, with loud and with deep tones, which are placed with batteries at the temporary posts. The loud bells are substitutes for the large semaphore-arms, and the deep-toned bells for the small arms. At the passage of a train the attendant manipulates on two buttons, producing the stoppage of the deep-toned bell which announced a train and the opening of the section at the antecedent post, and, at the same time, the ringing of the loud bell, announcing the departure of the train to the subsequent post.

To have, however, these temporary posts answer all the requirements which have been set forth for the electro-semaphores, a new apparatus has been devised, of simple construction and smaller proportions, giving the same effects, excepting the announcement of the signal produced at the neighboring station. This apparatus is illustrated in

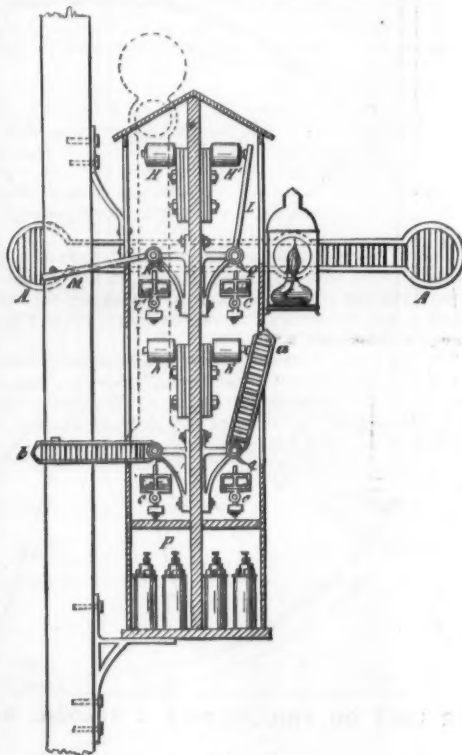


Fig. 14.

fig. 14. The two large and small arms are moved in position to be attracted by the magnets directly by hand, without the intervention of the apparatus; and the circuit-closer is Mr. Lartigue's new invention, which, being simple and yet producing various desired effects, has found several applications in the manipulation of the signals and switches. In the present case it is a box closed on all sides, of a non-conducting material; a partition divides the box into two compartments, both partly filled with mercury; in the two compartments are inserted the ends of the conducting wires, projecting a few millimetres on the inside; the box is pivoted and kept horizontal by counter-poising it, in which position there is no communication between the two wires; but should its equilibrium be destroyed a current will be established. The apparatus consists of:

Two large arms, *A A* and *B B*, pivoted on shafts which carry also two levers, *L* and *M*; each lever is solidly jointed with the respective arm, and has on its end a soft iron pallet which comes in contact with the poles of one of the two Hughes' electro-magnets, *H, H'*; the levers are also provided with fingers, *Q* and *R*, which, moving from one position to the other, strike and destroy the equilibrium of the respective mercurial circuit-closers, *C, C'*; two small arms, *a* and *b*, with the soft iron pallets, which come in contact with the Hughes' electro-magnets, *h, h'*, attached to them directly; and two fingers, *q* and *r*, which move two circuit-closers, *c* and *c'*. A battery, *P*, is placed at the bottom. The apparatus, being small, is easily transportable and can be attached to a telegraph post.

The electro-semaphores for the single-track road differ but little from those just described, they having to fulfill all the above enumerated conditions of the programme, including the sixth, which does not concern a double-track road: It

is necessary, in the present case, that the block section, having a train on it, should be closed for all other trains at both ends; and, besides, it is important that the attendants may not be able to send any new signals during the time that the section is blocked, otherwise a confusion may ensue. To accomplish this, a semaphore like that shown in fig. 15 is made, which differs from the other in the following particulars: The two lower arms are of the same shape and size as the upper arms; they are no longer signals to be observed by the attendants, but by the train-men; their mechanical action is just the same as that of the lower arms of the semaphore for the double track, although, when attracted, their position is pendant, while there they stood vertically up, this being accomplished simply by counter-balancing them.

The two lower arms when in horizontal position interlock the upper arms, which thus cannot be moved until the former are placed vertically. This is accomplished by introducing a latch, *W*, in the arrangement of the mechanism giving the audible signal, when a semaphore-arm is liberated, as shown in fig. 16. On the shaft of the lever *q*, which is articulated with the rod of the lower arm, is a cam which moves the tail of the latch *W*; the latch sets against a ratchet of the shaft of the lever *Q*, which is articulated with the rod of the upper arm. This happens when the lower arm is in a horizontal position, and as long as it remains such, the upper arm is locked. The tail by its weight will move the latter out of the ratchet, when the cam admits of it.

The lighting of this semaphore for the night is effected by one lamp, which is placed at the height of the lower arms only. Screens with red glasses, moved by the rods of the upper arms, are placed before the lamp, when these arms are horizontal. There is also a difference in the electrical communications between this and the semaphore for the

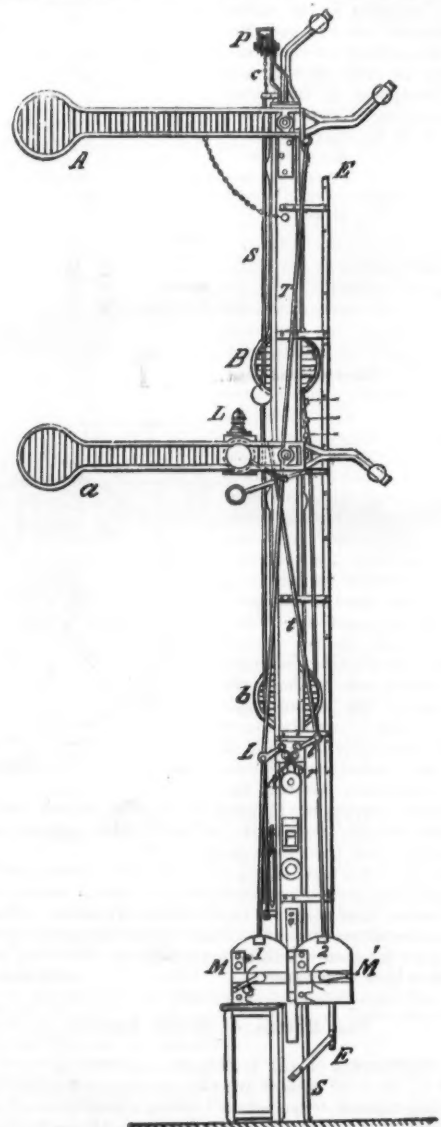


Fig. 15.

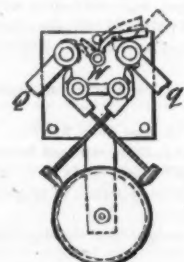


Fig. 16.

double track, namely, the commutator *K* (fig. 2) of the apparatus No. 1 is used here in the manipulation of signals, to send a negative current to the apparatus No. 2 at the neigh-

boring post. The target *V* does not announce the reception of a signal, but the arrival of a train at the end of the section, in the apparatus No. 1; and announces that a train is on line in the apparatus No. 2.

The manipulation of signals on a single-track railroad, equipped with the electro-semaphores, will be as follows:

The road is divided into sections by signal posts, *A*, *B*, *C*. The upper semaphore-arms, in their normal position—that is, when no train is on the road—are horizontal, at danger, and are held fast by the magnet in this position; the lower semaphore-arms are vertical and also held fast in this position by the magnet. (The arms of the double-track semaphores are locked in the same positions, as has been explained.) Should a train at *A* have to enter the *A B* section, the attendant, not being able to lower the upper arm, manipulates the commutator *K* of the apparatus No. 1, sending a negative current to the apparatus No. 2 at *B*, liberating thus the lower semaphore-arm at *B*, which closes the section for trains in the direction *B A*; the lower arm, when horizontal, interlocks the upper arm in the same position. The blocking of the section at *B* is thus secured at first; then the opening of the same section at *A* comes next, which is accomplished by a current sent automatically from the apparatus No. 2 at *B* to the apparatus No. 1 at *A*, effected by the movement of the lower semaphore-arm at *B*. As soon as the train leaves *A*, the attendant places the upper arm at danger, and by this movement sends a current to *B*, which announces there the departure of the train, by means of the target *V* and a stroke on the bell of the apparatus No. 2. Until the train

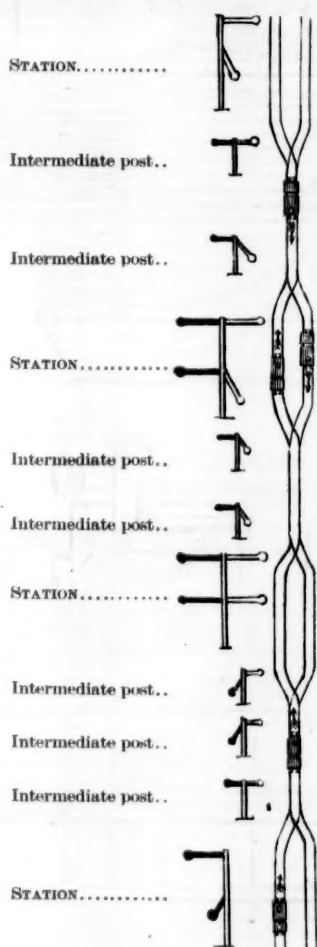


Fig. 17.

arrives at *B*, no modification of the signals can be effected; but after it has arrived there the agent lowers the lower semaphore-arm (which blocked the section in the direction *B A*), sending thus a current to *A*, which announces there the arrival of the train, by means of the target *V* and a stroke on the bell of the apparatus No. 1; the upper arm at *B* will become unlocked by the declination of the lower arm. The blocking of the following sections, as the train advances, is manipulated in the same manner.

It may occur that both attendants may simultaneously manipulate the signals to admit trains at both ends of the same section, in the opposite directions; they would simply cause the blocking of it at both ends, and then, exchanging conventional messages by means of the commutator *K* of the apparatus No. 2, open the section for one of the trains. But should the attendant let down the lower arm before the train had arrived at his post, and thus signal its arrival while the train was still on the section, a collision would be prevented by introducing between the posts at the ends of the section intermediate posts, selecting for them such places as have already guards employed there; for instance, important level crossings. The intermediate posts have two arms, which, in a horizontal position, are attracted by Hughes magnets. The first current, like that sent from *A* to *B*, only increases the attractive power of the magnets, producing no effect on the signals of the intermediate posts; but the returning current from *B* to *A* will liberate one of the arms, which descends, and this is accompanied by a stroke on a bell. The guard sets the horizontal arm again after the train has passed. The two arms

are interlocked with each other, so that only one of them can be let down at the same time; and if two trains were sent on the same section in opposite directions, one of them would thus be stopped by the intermediate post. Both of the bells, at the intermediate post, would, however, be struck, and warn the guards of the danger.

Fig 17 represents the relative positions of trains and signals on a single-track road.

Distant signals can be operated simultaneously with the electro-semaphores, by joining them with the cranks *B* of the apparatus, by means of levers and wires. (Wires are considerably used for such purposes on the continent of Europe, instead of rods or pipes.)

Interlocking between the electro-semaphores and switches can easily be effected.

The electro-semaphores can also be worked automatically, without attendants, the inventors having a special arrangement invented for this purpose; but, as yet, the French engineers are not favorably inclined toward the use of them.

Electro-semaphores such as have been described have been used on the Northern Railroad in France since 1874, on the double-track line between Saint-Denis and Creil, being a distance of 30.66 miles. The distances between the posts, of which there are twelve, vary from 0.65 to 3.78 miles; they were placed so irregularly in order to employ only the guards, already on duty at these places, to attend to them. Many observations which were made convince the writer that all the advantages expected from the introduction of electro-semaphores have been realized. On one occasion seventeen trains, carrying 8,400 passengers, were dispatched over a distance of 25.42 miles, the time from the departure of the first until the arrival of the last train being 129 minutes.

The Paris & Orleans Railroad Company has adopted the electro-semaphores, as improved by its engineers, Messrs. Heurteaux and Guillot. The object of the improvement is to protect the signals from being unduly liberated from the action of the magnets by lightning. It consists of an arrangement such that when a train occupies a section, and the upper arm of one post and the lower arm of another are horizontal, a positive current is sent from the apparatus No. 2 of one post to the apparatus No. 1 of the other, which only increases the power of the magnet. Should, now, in this condition, the upper arm be liberated by any cause, an alarm bell would be rung at each of the two posts, and thus warn the attendants of the unduly opened section; they would then communicate with each other, and set the signals right again.

There is, however, little probability that the signals would be moved by a stroke of lightning. Experience does not give, as yet, any evidence of it, it being necessary that the direction and the strength of the current should be determined, to accomplish this.

The theory, cost of introduction and of maintenance, tables of observations, etc., have been very minutely described in the *Annales des Mines*, for September-October, 1877, by Mr. M. F. Clérault, mining engineer; and their modification, as adopted by the Paris & Orleans Railroad Company, has been described, in the same journal, by Mr. M. R. Leiller, mining engineer.

The electro-semaphores are patented in the United States.

The Railway Delusion of Wholesale and Retail.

We recently expressed the belief that a national law which shall compel railways to make public all matters pertaining to their compensation for all descriptions of service is an essential preliminary to any effective attempt at learning to what extent, if any, national regulation of railway transportation shall be required or permitted. No expert, however familiar with the general subject, can hope to drag to light those discriminations which all who have been concerned in them are so bent on, and have grown so wonderfully ingenious and skillful in concealing, unless assisted by a law not limited by state lines, not capable of long successful evasion, and provided with penalties that will carry more terror to official respectability than mere money fines, which the corporation will pay. To be effective the penalties must reach the persons and purses of offending individuals, as well as the coffers of the companies.

The same act should be so framed as to prevent further ill-effects from the wholesale and retail delusion, which has already done great harm to the country at large, and to the railways themselves. The justification for this interference is to be found in the history of the rise and development of our railway system. We needed railways, and we got them in any way we could. City, county, state and national government means have been joined pell-mell with individual purses, poor and rich; while foreign coffers have been tapped by golden promises, and every sort of device which could coax or seduce money or labor into the creation of our railways has been resorted to. It is a curious and wonderful history. Such a mass of eager incompetents as have been selected to manage the "enterprises" projected in every locality—boards who knew nothing of the business, and who were selected chiefly for their supposed influence in commanding money; presidents who do not differ in quality from their boards; engineers who, if skilled at all, were, as a rule, only skillful in the technique of their profession and were unfitted to adapt investment cost to the expected traffic. The result of such mad energy has been truly American. First we have the railroads; they are here, all alive, all useful, all improving. Next we have had almost universal railway bankruptcy. In the complete list of our railways now built there is scarcely one which has from the beginning, and continuously, paid a fair interest on its entire cash cost. Many of them have passed through a legal readjustment, which has reconciled their capital account with the trade-contributing power of their territory by the painful process of obliterating most of the former from their books. Amid all this, however, we have been receiving an education; some sort of system and much good knowledge have been already evolved, and the process is going on with great rapidity. The costliness of the roads has prompted their managers to seek in every quarter for a commensurate revenue. It has been sought from trade in regions naturally tributary, and in regions altogether the reverse; it has been sought by exacting high charges on traffic which no rival road had access to, and by every sort of open and surreptitious tariff reductions where competition existed. This crude

and violent struggle has bred a multitude of inequitable discriminations between localities and between shippers, but it has yielded to the country one useful result which will never be lost: it has trained transporters in the art of effecting great movements with almost inconceivable cheapness. It has also given an impetus to another important movement which will never rest until its perfect work shall have been accomplished: the movement, namely, toward unity and simplicity in the operations of our vast net-work of comparatively little railways. The shapes which this impulse have hitherto taken are some of them extremely undesirable; such, for instance, as the accretion under one control of many roads. It will be better for the country and better for the companies when for this method of effecting unity and controlling traffic is substituted an efficient national law.

At present the drift of public sentiment, and perhaps the convictions of competent students, point to a union of the two agencies, government and combinations of individuals, as better fitted to perform the great task of transportation than either by itself. The share which the government should take, it is pretty well settled, should never be that of operating management, and rarely that of an investor or owner. It must lend its sovereignty to secure the land whereon the road shall be built, and it must endow the combination or corporation with suitable and sufficient powers. Thus far all parties are substantially agreed. The conviction is also growing that the national government must so far join in the work as to give substantial operating unity to what is now in many respects a disjointed and contentious aggregation, and to prescribe such bases for the conduct of the service as shall insure substantial equity to all localities and to all persons. It must begin by fixing an equitable limit to the wholesale rate. It is a judicious and well-founded commercial doctrine that transactions of large volume can be wisely made at a much less profit per given unit than should be expected on petty dealings. But in the application of this law there are two unwise extremes of either regarding it too little or applying it too extensively. The latter is just now much in vogue on railways, and has developed some grave evils—serious social disorders and business disaster to numbers of thrifty and enterprising people.

It is probable most transporters would promptly name the car-load as the proper limit of the wholesale rate. Omitting any reference to distance, it is a very natural unit or line of division. The expense of moving a half-loaded car practically differs but little from that of moving one fully loaded. It is also true that there is very little difference in the cost of moving a full or half train of cars, and that the full train of cars entails the minimum expense per ton. But it is seldom that a single shipper can furnish a full train at regular periods and, when such is the case, that very power gives him a dangerous control over the income of the road. Full and regular trains will more surely follow a policy which creates a multitude of moderate shippers, as will always be the case when the conditions for creating trade exist, and the transporter adopts the car-load as the only unit for wholesale rates. Shippers less than a car-load are more costly to the carrier per unit of weight than larger ones. Higher or retail rates can justly be applied to them, and will not improperly burden the public.

If a manufacturer of carpets had several valuable customers, who each purchased a good line annually, its manager would not look with favor upon a proposition from one of the number so to reduce prices to him as to enable him eventually to drive the others from the field. He would naturally ask whether the total purchases would be then increased; if not, what object there could be in such a step. It would help the customer—that would be evident; but how would it serve the maker? True, one man would then buy as much as six, and his trade being six times larger than any other person's had ever been, he should, according to some current railway practice, be given a wholesale rate. If a wholesale price is to be based simply on the element of quantity, then the supposed single buyer should have the desired concession; but if other elements properly enter into the question those elements should have their due consideration and influence. A seller who reduces his price per unit does so chiefly because he is reasonably certain thereby to increase his total profits in any given period of time; or, to put it in a different shape, not only his total business, but his total profits in a month, or a year, or a decade, should be greater than they would have been under the policy of a smaller trade with a larger profit per unit. Moreover, if he is a prudent man, he will wish to guard carefully against the probability of finding his own business drift into the control of any single wholesale customer. Any one who, when making wholesale rates, disregards these two important matters is building his business house on a sandy foundation, and it will certainly come to harm.

The unwise use of wholesale rates is peculiarly injurious to a railway. The probabilities of a foolish resort to it are much greater when the ability to employ it, instead of being vested, as in the supposed case of the manufacturer, solely with the watchful, well-trained and alert proprietor, is placed in the hands of a single officer, frequently possessed of little commercial experience, not interested beyond his salary, and wielding the power inherent in an investment of millions almost without any practical supervision by its actual owners. The evil effects of any such folly are multiplied to a railway by as many times as the sources of its revenue are varied. The carpet-maker, whatever he may do, has but one fountain of profit to be damaged, and that is the gain on the carpet the may sell. But a railway company which, by a well-known, uniform, equitable, and apparently assured policy, has attracted many forms of industry to the line of its road, carries not only their products but the people connected with them, and all the material which those people use. Should it reverse that policy, and, by employing the destructive power of discriminating rates, concentrate into a few hands the control of any one of its large tributary industries, it will subject itself to the monopoly thus created, and blight everywhere within its influence the chief portions of the incidental traffic which its juster course had brought into being. Perhaps the most striking instance of this which America has yet seen was described in a recent address of the petroleum-producers to the Governor of Pennsylvania. Many small refineries formerly lined the railways along the valleys of the Allegheny River and its tributaries. Under equal rates of rail carriage they enjoyed a moderate prosperity on small profits. They have mainly disappeared; the works have been dismantled; the owners are bankrupt; the laborers and all dependent upon them are gone. They have given way to one huge concern, whose factories are chiefly elsewhere, whose annual net revenues are computed by millions, and who can dictate not only what rates the railways may charge, but what proportion thereof they themselves shall receive.

It is remarkable that in the case of the oil-traffic the real object of the roads was totally foreign to all questions properly involved in the consideration of wholesale and retail rates. That object was combination. They had fought over the oil-trade, as over every other sort of traffic, to the point of mutual ruin; and their contests had been ingeniously stimulated by the very party which aspired to the profitable rôle of peacemaker, and finally secured it. Its method was so to apportion its own shipments among the competing roads as substantially to assure to each a previously agreed percentage of the whole oil movement. Its price for this

service was a secretly paid share of the liberal rates which the roads were thus enabled to charge—a share which has ranged from one-fourth to something in excess of one-half. Armed with the crushing power of this monstrous discrimination, it at once entered upon a course avowedly designed to destroy or acquire all other property engaged in the same business as itself. In the execution of this purpose it has been painfully successful. The disastrous effects of the whole procedure are slowly coming to light through investigations now making by Congress, and under the auspices of the Supreme Court and other authorities of the state of Pennsylvania. They fully account for the well-restrained but bitter and seething temper of the oil regions in the same state, which has at times almost reached that consuming stage, when, despairing of justice through the regular tribunals of law, a rude equity is snatched from unjust power by a spasm of destruction and terror.—*The Nation*, Feb. 20.

Verderber's Locomotive Boilers.

The *Austrian Railroad Journal* has a paper from Mr. Stefan Verderber, which we find also translated in *Engineering*. A subsequent issue of the Austrian paper states that Mr. Verderber has taken out a patent for his arrangement in Austria. We copy from the *Engineering* as follows:

We have received from Mr. Verderber, the inspector-in-chief of the Hungarian State Railways, some very interesting particulars of the results he has obtained with a new construction of locomotive boiler of which we now publish illustrations. The peculiar feature in this boiler, which has

"2. The temperature of the burning gases diminishes during their progressive movement in the tubes, and therefore less heat will enter the boiler toward the smoke-box end.

"3. Finally, and principally, the deficient heating capability of the boiler-tubes is accounted for by the fact that nearly 50 per cent. of the available heat is absorbed by the fire-box before the burning gases enter the boiler-tubes, in consequence of which they cannot possibly take up more heat.

"There is no reason at all why the tubes should—at equal temperature and density of the burning gases—evaporate less water per square foot of surface than the fire-box; I had, therefore, no doubt whatever that, if the burning gases at their original temperature could be led into the boiler-tubes, they would receive the whole available heat, and consequently the tubular boiler would do as much work without the fire-box as with it—that is to say, the fire-box, as a steam-generating part of the boiler, is superfluous.

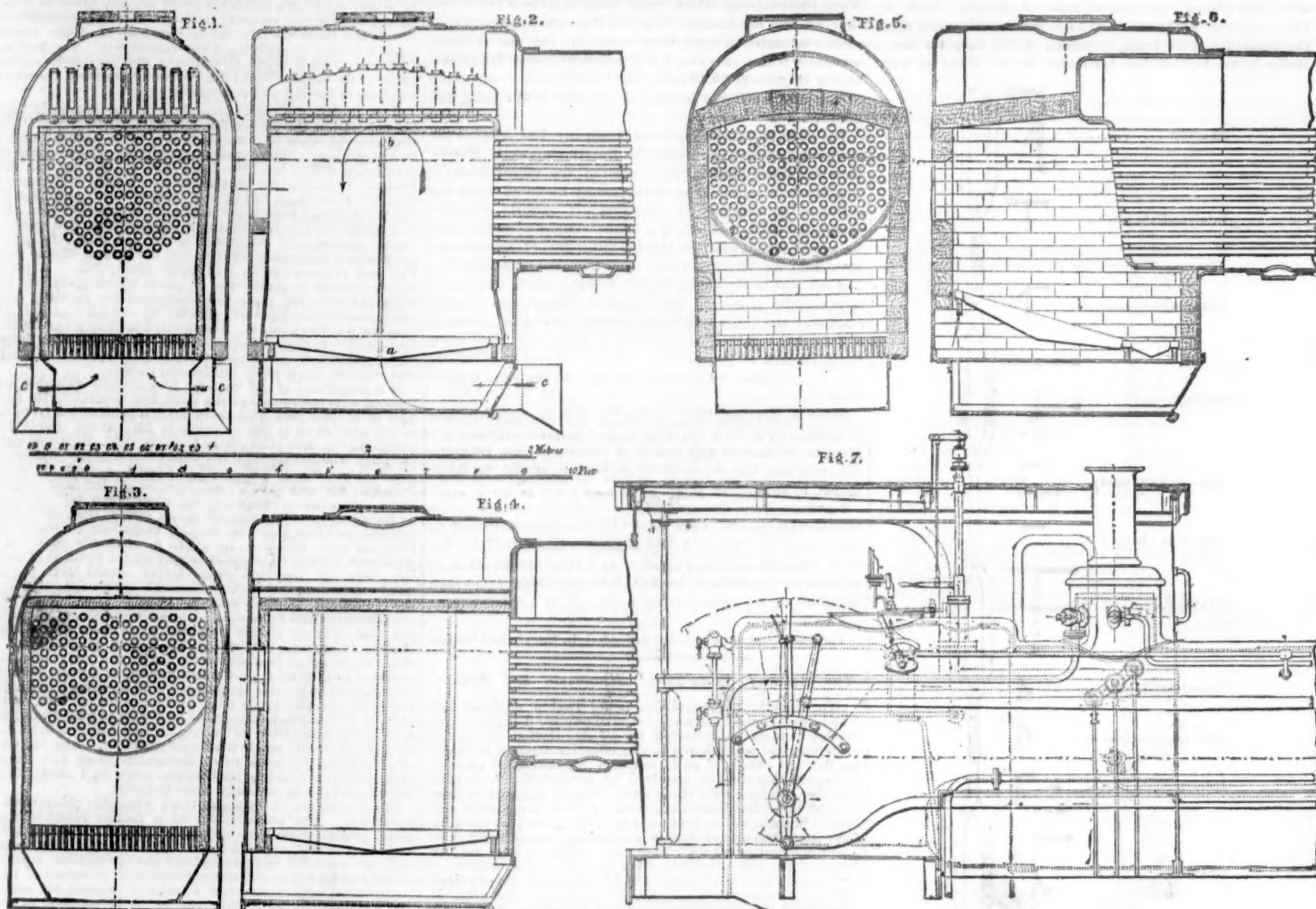
"Although the minute examination of the results of the interesting experiments carried out by the French *Chemin de Fer du Nord* regarding the evaporative capability of locomotive boilers published by M. Ch. Couche in his work, 'Matériel Roulant et Exploitation Technique des Chemins de Fer,' vol. iii., led me to the same conclusion, I hesitated to reconstruct a locomotive engine before my notion was proved by an experiment to be correct. I therefore isolated the fire-box from the boiler of a locomotive by fitting it to plates covered with fire-clay. Figs. 1 and 2, page 114, shows how the isolation was carried out. The plates were placed at a distance of 60 to 70mm. from the copper fire-box, and the intervening space was divided into two parts by means of a diaphragm *a b*. The cold air entered through the conical opening *c* into the space and was led from there under the grate. The temperature

from the outside—as was the case with the isolating walls—was not at all altered by the influence of the fire.

"The dispensability of the fire-box as a steam-generating part of the boiler, and the durability of the fireproof material, having been clearly shown by the experiments with the isolating walls, the reconstruction of a locomotive was decided upon, and for this purpose our goods train locomotive No. 39 was chosen, this engine having three coupled axles and 38 tons adhesion weight, and its copper fire-box being defective and requiring renewal. The reconstruction was carried out as shown in Figs. 3 and 4. The tube-plate was put on the end of the cylindrical boiler, so that the tubes remained of their original length; a casing of 9mm. plate was pushed into the outer fire-box casing for receiving the grate. The inner sides of this casing were covered with 30mm. to 40mm. (1.2 in. to 1.6 in.) of fire clay (*chamotte*), which was fastened to the plate by small riveted hooks. The positions of the glass gauge, gauge-cocks, whistle, etc., had to be accommodated to the construction.

"After the so reconstructed locomotive had done station service a few days without any complaint, a trial trip was carried out on Aug. 11, 1877. The train was composed of the locomotive, the tender and 37 empty goods-cars, and went with a speed of about 40 kiloms. (about 25 miles) per hour. The steam generation was normal, the same as with locomotives with common fire-boxes.

"The train went from Budapest to Isaszeg (about 17½ miles) without stopping; after the train had stopped at Isaszeg about 10 minutes, the middle tubes began suddenly to leak and to such a degree that the water gushing out from between the tubes and their seats in the tube-plate extinguished the fire. The locomotive, not being able to do any more service, was brought into the repairing shop. A very minute examination proved the tube-plate to be bent



VERDERBER'S LOCOMOTIVE BOILERS;

Hungarian State Railroads.

been patented by Mr. Verderber, is that the heating surface of the fire-box is dispensed with, there being employed, in place of the ordinary fire-box, a combustion chamber lined with fire-proof material. The account of the experiments which led to the adoption of this system of construction can best be given in Mr. Verderber's own words as follows:

"On most lines of the Hungarian Government railways the feed-water is very bad, and forms large quantities of sediment; consequently the boilers of this company need more frequent and extensive repairs, particularly on their fire-boxes, than those of other companies having at their disposal a better kind of feed-water. Under these circumstances I endeavored, as many other engineers have done before, to remove, or at least to lessen, this inconvenience caused by the failure of fire-boxes. Examining the investigations of others, I became convinced that only by abolishing the water-surrounded fire-boxes would there be a possibility of effecting a real remedy, and, in consequence, I tried to solve this problem, and contemplated the employment of a cylindrical tubular boiler combined with a fore-fire of fire-proof material for receiving the fire-grate.

"The fact that the fire-box, with a moderate application of the blast-pipe, produces nearly 50 per cent. of the whole steam produced by the boiler, has led to the false notion that the cylindrical part of the boiler is not capable of producing the necessary quantity of steam without the aid of the fire-box. My observations, however, led me to another conclusion. It first struck me why the heating surface of the tubular boiler performs so little work in comparison with the fire-box. The reasons for the small capability of the boiler tubes in comparison with the fire-box are the following:

"1. The burning gases pass only through a part of the tubes, consequently the other part is either quite or partly out of action.

In the space between the fire-box and the fire-clay covered plate was 300 deg. to 350 deg. Cels. (572 deg. to 662 deg. Fahr.), while the locomotive stood still, and 70 deg. to 90 deg. Cels. (158 deg. to 194 deg. Fahr.) while running, according to the speed, upon which the draught depended. The locomotive working with a pressure of 8½ atmospheres, the temperature in the space was, during work, about half of that of the copper fire-box sides, therefore not only was no heat given up to the boiler by the fire-box during work, but the fire-box even lost a part of its heat to the entering air.

"The locomotive fitted out with this isolating plate-wall was a passenger engine, which took the trains between Budapest and Miskocz 10 weeks running. The result was found to be that 1 kilo. of coal evaporated the same quantity of water as before putting in the plate. Now, after the locomotive had been in service through 10 successive weeks, the isolating plate-walls inside the sides and crown of the fire-box were taken out, and upon the same line, with equal speeds and weights, the observations were continued, the result showing the same effect as regards the heating power of the coal. By means of these simple experiments, it was clearly shown that with the present dimensions of the cylindrical part of the locomotive boiler, the fire-box as a steam-creating part can easily be dispensed with. If, therefore, some engineers pretend to have, or really should have gained favorable results by enlarging the direct heating surface—that is, the fire-box sides—then the increased capability of the boiler thus gained is not to be accounted for by the larger fire-box surface, but probably by the enlarging of the fire-grate, as in consequence of this larger quantities of coal have been consumed.

"The experiment with the isolating plate-walls also gave information as to the durability of the fire-proof material in the fire-box. It was noticed that this material, if cooled

in an S-shaped curve and about half of the tubes to be loose in their seats. As no other fault could be detected the tubes were riveted up and other trial trips were managed. During these the curve of the tube-plate remained unaltered, but the leaking of the tube seats always took place the same as at the first trial trip, after a long stoppage.

"The reason for this leaking was as follows: The intervals between the tube holes of the tube-plate expanded, and as the ends of the tube-plate were not exposed to the fire and could not expand freely, the copper tube-plate was obliged to expand against the tube ends, which caused the tube seats to become smaller in diameter, in consequence of which the tube ends were compressed. When cooling down took place the holes got into their original size, which the tube ends did not, and of course the water rushed out as soon as the cooling occurred. Although these first trials did not show that a practical arrangement had been attained for general use, they clearly showed that the fire-box as a steam-generating part could be dispensed with, and I felt, therefore, justified in continuing with the experiments.

"To avoid the faults experienced in the locomotive No. 39 during the first trials, I resolved to try the construction shown by Figs. 5 and 6. In this arrangement, as shown in Fig. 6, the cylindrical part of the tubular boiler reaches into the fire-room, the tube-plate is composed of two parts, and has a play for expansion both in the vertical and horizontal direction. With this system I had our locomotive No. 104 fitted up, this being again a goods train locomotive with three coupled axles and an adhesion weight of 36 tons. After its reconstruction it was put to regular traffic, and ever since it has performed regular service.

"On purpose to obtain exact results about the performance of the locomotive No. 104, very detailed experiments were carried out, and to get comparative results, parallel trials were made with the locomotive No. 19, of the same

TABLE SHOWING SUMMARY OF RESULTS AS REGARDS COAL CONSUMPTION AND WATER CONSUMPTION OBTAINED FROM LOCOMOTIVES NOS. 19 AND 104.

Locomotive.	Class.	Number.	LINE OF RAILWAY.	Distance.	Average load taken from tables of load.	Real average load.	Effect.	Coal consumption.		Standard allowance of coal for the work.	Savings.	Distributed premium.	Water evaporated.	Evaporation per ton of coal.
								Total.	Per 100 tons, kilo.					
III.	19	Budapest-S. Tarjan.	kilm.	tons.	tons.	100 tons.	kilm.	kilo.	kilo.	kilo.	kilo.	ft.	kr.	kilo.
III.	104	"	"	"	"	"	"	"	"	"	"	"	"	"
III.	19	Budapest-Miskolcz.	"	"	"	"	"	"	"	"	"	"	"	"
III.	104	"	"	"	"	"	"	"	"	"	"	"	"	"
III.	19	Durchschwittlich leide Linien.	"	"	"	"	"	"	"	"	"	"	"	"
III.	104	"	"	"	"	"	"	"	"	"	"	"	"	"

Locomotive No. 104 has a cylindrical tubular boiler with grate in front, inclosed in fire-brick box. Locomotive No. 19 has an ordinary fire-box.

type with a common fire-box. An abstract of the results of these trials is shown in the annexed table. For fuel coal from the S. Tarjan mines was used, this fuel belonging to the better sort of brown coal.

The table enables a judgment to be formed of the capability of the boiler without a fire-box as a steam-generating part. The summary shows that the locomotive No. 104 evaporated 4.55 kilos. water per 1 kilo. of coal, whereas No. 19 evaporated 4.62 kilos., that is, 1 1/2 per cent. more. This difference is so trifling, that it could not be asserted whether it is to be accounted for by the construction, or else by such incidents as will occur during trials like these, and the influence of which upon the results cannot be determined.

The following points have been noticed during the working of the locomotive No. 104:

1. With equal consumptions of fuel the blast pipe must be throttled closer than with the common fire-box, because the burning gases in the isolated fore-fire have a much higher temperature than in the common fire-boxes surrounded with water. Concluding from the quantity of water evaporated by the common fire-box, the temperature in the isolated fore-fire might have been about 300° to 400° Cels. (540° to 720° Fahr.) higher; therefore the volume of the burning gases entering the boiler tubes will be 30 to 40 per cent. larger than is the case with common fire-boxes.

2. The settling of the solid ingredients of the feed-water, which takes place in the common locomotive boiler at the fire-box end, occurs in this case in about the hind third of the length of the tubular boiler, which shows that this part produces the steam, whereas, in common locomotive boilers, this is chiefly done by the fire-box. For this reason this part of the boiler must be kept clean, and it is advisable to omit a few tubes in the lower part, and to put washing plugs instead; it has also proved very handy in practice to put a man-hole into the lower part of the boiler, as shown in Figs. 2, 4 and 6.

3. The fire-box being omitted, the quantity of boiler water is consequently very much reduced, which causes the water-level to fall more quickly during work if no proper feeding takes place. This can be prevented by an injector acting continually, and answering the average consumption of water.

4. The fire-box is cased with plate, and the space of about 50mm. (2 in.) is stuffed with slag-wool; consequently the temperature of the casing-plate is much lower than that of a common locomotive. One may safely put his hand upon the casing-plate of the locomotive No. 104 while working, which one could certainly not do on other locomotives. This shows that less heat will be given up to the outside than is the case in locomotives with common fire-boxes.

5. The locomotive No. 104 had at the beginning a plate-casing the same as locomotive No. 39 (figs. 1 and 2); afterward this casing was put away, and a common fire-brick lining with arched roof was made (figs. 5 and 6), which has worked about five months, and wears very well. My apprehension that the brick-work would suffer by the shaking of the engine has proved unfounded. The fire-clay-covered plate-casing has the advantage that steam will be sooner raised, because the coating of fire-clay (*chamotte*) 30 to 40mm. thick, will absorb less heat than the massive wall, but the plate-casing being more expensive, and apt to scatter down, a simple fire-brick lining is by all means preferable.

For the locomotive engineer, the experiments above described will be of great interest, they showing that the fire-box as a steam generator can be dispensed with, and that the cylindrical part of the boiler is quite sufficient for this purpose; that as for the steam generation, the ordinary dimensions of the barrel are sufficient to contain tube surface to do the work if the heating surface of the fire-box is enlarged or reduced. It will also be of interest to technical men to know that the fire-brick lining of the combustion-chamber stands perfectly well against the shaking of the locomotive as well as against the temperature of the fire-box and a fire-proof force; fire is, therefore, practically applicable to locomotive boilers.

It must be left to further experience to decide whether these facts have in my system of construction been duly made use of, and it is to be desired that further experiments should be carried out by others, as the eminent advantages of dispensing with the fire-boxes are quite undeniable. The difference of the cost between renewing a single cylindrical tubular boiler and a common locomotive boiler with a copper fire-box shows clearly the advantage. The cost for replacing a new copper fire-box amounts in large locomotives to from £250 to £300, whereas the reconstruction, according to my system, taking in calculation the value of the old copper material, does not cost quite £50.*

The Inspection and Repairs of Freight Cars and the Safety of Train-Men.

[Discussion at the February Meeting at the Rooms of the Master Car-Builders' Association, Feb. 20, 1879.]

The February meeting was held at the rooms on Thursday evening, Feb. 20, the subject for discussion being "The Inspection and Repairs of Freight Cars, in Connection with the Safety of Train-Men on Freight Trains."

Mr. Leander Garey, President, was in the chair. In opening the meeting, and stating its object, he reverted to the change that had grown up in the work of inspection and repairs of freight cars in late years, through the system of interchanging cars, so that those of each road are now scattered all over the country, and consequently are far less subject to careful inspection and keeping in order than when they were in merely local use. Particularly in those respects upon

which the safety of the limbs and lives of the train hands depend, there is reason to believe that information is lacking. To get the views of the men who are most deeply interested in this matter, the yard and train hands had been invited to appear at this meeting and speak for themselves; but, unfortunately, they are, in this busy season, unable to do so. Letters had, however, been received which would point out some matters worthy of consideration.

A number of letters were read which contained recommendations which no humane railroad manager should disregard. Mr. Kirby, the Master Car-Builders of the Lake Shore & Michigan Southern Railroad, suggested:

"1. The steps placed at each end of freight cars, by which the train-men climb to the top of the cars, should be made secure, especially the step first from the end sill. At this step there should be an off-set or stop of some kind to prevent the foot from slipping off at the end. All the steps should be firmly fastened to the car. Too often the screws used for fastenings are driven to their heads with a hammer. Inspectors should be enjoined of the importance of seeing that these steps are secure. A good, strong step should be fastened to the side sill, and a handle above it at the two corners of the car adjacent to the steps.

"2. The running-board should be not less than 18 in. wide. A wide running-board assists the train-men in getting over their trains at night and in slippery weather.

"3. The draw-bars and their attachments, the brake-wheel, shaft, chains, etc., I will leave for some able person to write about. I hope that that person will not fail to say what a mean thing a wrought-iron draw-bar is to couple into, especially when the mouth is just about large enough to receive the link."

Mr. E. A. Cooper, Yard-Master of the Jeffersonville, Madison & Indianapolis Railroad at Indianapolis, wrote in substance that the arrangement of draw-bars, but especially their uniform height from the track, was very important. He recommended "a good cast-iron pattern sufficiently strong to withstand any ordinary concussion, the springs and carrying irons to be made sufficiently heavy to resist the shocks. The dead-woods should be situated over the draw-bar and measure about 20 in. long and 6 in. thick, and be bolted solidly to the car sill."

Mr. Joseph Sanger, Yard-Master of the Indianapolis, Peru & Chicago Railroad, wrote and gave the following as some of the causes of accidents to yard-men:

"1. 'The different heights of draw-bars.' (The Master Car-Builders' Association has done what it could to remedy that evil.)

"2. 'The insufficiency of follower-heads and springs.' They should be of sufficient strength to stand a reasonable concussion in coupling cars. We have a great many men who have their fingers hurt by the spring not being stiff enough or the follower strong enough to prevent the draw-bar from going back.

"3. 'The different kinds of draw-bars.' There are almost as many kinds as there are railroads in the country. * * *

"4. The dead-woods or blocks should be 2 ft. 6 in. long by 6 or 8 in. thick, bolted to the sill of the car above the draw-bar; are better than the square blocks 6 in. square, such as are used on the Union Line cars.

"5. The brake staffs should all be on the same side of the cars, right or left. I saw last month in Boston a brakeman on the New York & New England Railroad who had his hand mangled by two brake wheels coming together."

RAILROAD EARNINGS IN JANUARY.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1879.	1878.	Inc.	Dec.	P. c.	1879.	1878.	Increase.	Decrease.	P. c.	1879.	1878.	Inc.	Dec.	P. c.
Atchafalpa, Top. & S. Fe.	879	786	93	11.8	\$315,500	\$174,598	\$140,902			80.7	\$359	\$222	\$137		61.7
Burlington, Col. Rapids & Northern.	434	424	10	2.4	117,362	165,411		\$48,049		29.1	270	360		\$120	30.8
Cairo & St. Louis.	146	146			16,054	10,967	5,087			46.2	110	75	35		46.2
Central Pacific.	2,180	2,067	113	5.5	1,143,000	1,110,988	32,012			2.9	524	537		13	2.4
Chicago & Alton.	678	678			341,675	301,073	40,602			13.5	504	444	60		13.5
Chicago & East. Illinois.	159	159			68,167	64,991	3,176			4.9	429	409	20		4.9
Chicago, Mil. & St. Paul.	1,729	1,414	315	22.3	592,000	705,805		113,805		16.1	342	409		157	31.5
Chi. & N. W.	2,159	2,078	81	3.9	1,044,250	1,077,891		33,641		3.1	484	519		35	6.7
Cleveland, Mt. V. & Del.	157	157			28,980	29,156		167		0.6	185	189		1	0.6
Galveston, H. & H.	50	50			48,932	41,996	6,936			16.6	979	839	140		16.6
Grand Trunk.	1,390	1,390			848,228	854,113		5,885		0.7	610	614		4	0.7
Great Western.	511	511			376,247	518,940		142,693		27.5	736	1,016		280	27.5
Hannibal & St. Joseph.	292	292			135,423	135,444		379		0.3	464	462		2	0.3
Illinois, central, Ill. lines.	854	818	36	4.4	450,581	487,750		37,169		7.6	528	590		62	11.4
Iowa lines.	402	402			100,573	130,009		30,336		25.0	341			91	26.5
Ind., Bloom. & Western.	343	343			61,823	130,318		28,495		23.7	368	353		85	23.7
International & Gr. Nor.	516	516			100,090	134,883		25,806		19.1	311	261	50		19.1
Kansas Pacific.	673	673			179,773	198,610		18,837		9.5	267	295		28	9.5
Memphis, Paducah & N.	115	115			15,355	16,546		1,191		7.2	134	144		10	7.2
Missouri, Kan. & Tex.	786	786			194,453	217,028		22,575		10.4	247	276		29	10.4
Mobile & Ohio.	527	527			190,000	271,992		81,992		30.1	361	510		155	30.1
Nash., Chattanooga & St. L.	349	349			157,278	177,806		20,528		11.5	451	509		58	11.5
Paducah & Elizabeth.	185	185			25,191	27,767		2,576		9.3	136	150		14	9.3
Philadelphia & Reading.	800	800			957,215	673,980	283,235			42.0	1,197	832	365		42.0
St. Louis, Alton & T. H.	71	71			48,460	40,075	8,385			20.9	683	564	119		20.9
St. Louis, Iron Mt. & So.	685	685			331,320	375,522		44,202		11.8	484	548		64	11.8
St. Louis, K. C. & Nor.	530	530			256,519	264,289		7,770		2.9	484	499		15	2.9
St. Louis & Southeastern.	354	354			82,477	85,967		3,490		4.1	233	243		10	4.1
Toledo, Peoria & War.	257	257			94,907	130,466		35,559		27.2	400	550		150	27.2
Union Pacific.	1,042	1,042			693,541	693,541		6,959		1.0	693	693		0	1.0
Wabash.	688	688			312,677	386,919		74,242		10.2	454	562		108	19.2
Total.	19,921	19,273	648		\$9,415,639	\$9,635,360	\$219,721			2.3	\$473	\$500		\$27	5.4
Total inc. or dec.			648												

* For a portion of the above report we are indebted to the New York Sun.

Mr. Hopkins was introduced by the President as a gentleman who had worked his way up from the position of "doper" to that of Superintendent, and perhaps higher, and consequently one who was thoroughly posted on railroad affairs. Mr. Hopkins said that, having experienced them in his younger days, he necessarily remembered well and fully appreciated the dangers encountered by train hands. Their work is especially perilous in the winter time, when the running-board is wet, icy or covered with snow, and a single slip or false step of the man hurrying over that treacherous place in the darkness will hurl him down to an instantaneous and horrible death. And he must not only run over the cars, but must jump from one to another, a distance of three or four feet. Let his foot slip as he jumps, or as he alights, and in a second he will be down between the cars and cut to pieces. The speaker at one time, while conducting on the Erie road, had an excellent gang of brakemen, and while he was with them none of them were injured; but within a couple of years after he left, three of them were killed while in performance of their duties. One, while disentangling a bell-cord, had to stand with his back toward the way the train was going, and while in that position had his brains dashed out by striking a low bridge. The others fell by accident between the cars and were crushed. Not only should the cars be brought closer together, but the brake should, if possible, be guarded; and he thought it would be practicable to have an iron upright guard around which a man might throw one arm while applying the brake, so that in case of the breaking of the brake-chain, or slipping-off of the brake-wheel—accidents by no means infrequent—he might save himself from being precipitated between the moving cars, the almost inevitable consequence now of such an accident. As for the deaths and injuries suffered by men in the perilous work of coupling cars, he believed every railroad-man present had known some one whose life had been sacrificed in that way. Statistics gathered by him in 1852 demonstrated that the proportion of men killed in that way on certain United States railroads was greater, to the number employed, than the proportion of officers and soldiers killed in the war. That which is wanted is a reliable standard draw-bar, one that is self-coupling or not at the will of the operative. But if we cannot have that perfect protection against accident, let us at least adopt a uniform draw-bar, one that the men may all become accustomed to and expert in the use of, not a score of various kinds, each of which has its special dangers, with which a man must become acquainted. If railroad officials would give any such care to protecting the lives of their employees as they do to saving passengers or freight, two-thirds of the accidents that now occur might be avoided. But they do not even seem to remember that their men are human, sometimes. They should remember that a brakeman is worth nothing in the caboose. His post of duty is on the top of the train, where he is exposed to all the inclemency of the weather, but where he must remain to be on the watch against possible dangers to the train. He often becomes so benumbed by cold that his hands lose feeling; he can only tell that he has a hold upon the brake by seeing that he has; his limbs are so stiff that if he slips he can do little or nothing to save himself from death. Not one man in fifty who does his duty properly as brakeman on a freight train through one of our inclement Northern winters, will escape permanent injury to the constitution from so doing.

Mr. M. N. Forney expressed his indignation at the indifference and carelessness of railroad officials generally concerning the dangers to which train-men are exposed. He had seen some freight-cars out West with dead-woods but three inches thick, so that a man caught in coupling them would be mashed flat, and have a couple of bolt-heads to impale him besides. The cars generally in use by the coal companies of Pennsylvania he characterized as perfect man-traps, seemingly almost devised to take human lives. That a step or hand-hold upon which a man's life depended should be insufficiently fastened he regarded as a thing so atrocious that it should be punished by sending the guilty builder to a state prison. He suggested that it would be well to collect statistics of the number of men killed and injured on train service, and to make such information public from time to time, in order that, eventually, public indignation might force railroad officials to a reform of these evils.

The President remarked upon the usual imperfection of inspection of freight cars. Inspectors look to their running gear, draw attachments, and brakes, but seldom or never to dangerous ladders, loose brake-wheels, broken running-boards, or other things upon which merely the lives of brakemen depended.

Mr. Forney described and illustrated upon the black-board a device introduced on the Chicago, Burlington & Quincy Railroad freight cars, consisting of a bracket or lug cast on the draw bar to prevent it being compressed beyond a certain point. It was a thing, he thought, which would save men's hands from the injuries often inflicted in uncoupling, and would save springs from being broken.



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S. WRIGHT DUNNING AND M. N. FORNEY.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

LOCOMOTIVE FIRE-BOXES WITHOUT WATER-SPACES.

If all the locomotive builders and master mechanics in this country who have not read the paper of Mr. Verderber, on another page, were asked whether it would be possible to make a successful and economical locomotive boiler without having a water-space around the fire-box, probably there would be an almost unanimous negative reply; and yet those who will read the description of Verderber's locomotive boilers will find that this is exactly what that engineer has done on the Hungarian State Railroads. The idea that a water-space all around the fire-box of a locomotive is an absolute necessity is one which, since Stephenson's time, never seems to have occurred to any one to question until now, notwithstanding the fact that this portion of locomotive fire-boxes has been the most expensive and troublesome part of that machine to construct and maintain. An examination of the published reports of the Master Mechanics' Association will show that ever since its first organization no subject seems to have occupied so much of the attention of committees, and excited more interest in its discussion than the question of fire-box construction. Western master mechanics especially have come to the meetings year after year, asking how the evils which attend the use of the impure water of that region of the country could be overcome. They have annually described and narrated the trouble resulting from the cracking, the corrosion by pitting and channeling, and the wasting away of plates in the fire-boxes. Every device has been tried that promised relief, and yet the evil has been only mitigated. Besides the failure of the side-plates, there was, and is, the difficulty of holding up the crown-sheet, which is the most troublesome part of locomotive construction.

A great variety of devices for staying crown-sheets has been tried, and much ingenuity exercised in making them secure, and yet it is safe to say that very much the largest proportion of explosions of boilers is due to the failure of some of the fastenings of the crown-sheet, or of the portion of the boiler immediately over it, or else to the undue exposure to the action of heat, by reason of low water.

The news that a method has been provided of abolishing altogether the water-spaces and crown-sheets of locomotive fire-boxes, with all their attending evils, should therefore be hailed with rejoicing by master mechanics and railroad men generally. It will, however, be a matter of surprise to most locomotive engineers who read carefully the reasons which led Mr. Verderber to make the deductions which he has presented so clearly, that no one ever did the same thing before. No one has ever seemed to raise the question whether it would be possible to dispense with the water-spaces around locomotive fire-boxes, although in a large class of stationary engines they are not used; but the form of construction adopted by the first inventors, or at least builders, of locomotives has been acquiesced in, just as the other inevitable ills of life are accepted. It will, therefore, not be surprising if the conclusions of Mr. Verderber are at first received with general skepticism. Any one, however, who will read his paper will be struck with the modesty with which his views are presented, and those who will give careful consideration to the reasons which he advances, and the experimental evidence which he has presented to confirm his theories, must, we think, be convinced of the extreme probability, if not certainty, that both his reasoning and his conclusions are worthy of the most serious consideration, and are entirely credible. If the results which he has accomplished are confirmed by other experimenters, the consequences and advantages resulting from this discovery will be hard to realize fully. It will, in fact, reduce the locomotive boiler substantially to a plain cylindrical form with tubes extending from one end or head to the other, dispensing entirely with the crown-sheet, crown-bars and all the complicated and expensive system of braces which must now be used to strengthen the boiler above the fire-box. The fire-box plates, with all the attending trouble, annoyance, expense, delay and danger which results from cracking, corrosion, channeling and other causes of failure, with the whole system of stay-bolts and the accidents to which they are so liable, will be entirely abolished. The outside shell of the fire-box, instead of being made of the best quality of boiler plate and flanged, riveted and caulked in the most expensive way, may instead be made of the cheapest quality of iron plates and the seams or attachments need not even be water-tight, because the only service which the shell must then perform will be to hold the fire-brick casing together. The duties of locomotive runners will be attended with much less responsibility than at present, because there will then be no danger of burning the crown-sheet or other fire-box plates, either on account of low water or from foaming or other causes. The effects of expansion and contraction, now so disastrous to locomotive boilers, will be very much less injurious than at present, because they will be exerted on a structure more simple in form, and in which the differences due to the effects of heat or cold can be provided for with less difficulty.

It would not be hard to anticipate the objections which a certain class of men will make to using this kind of boiler. "Why," they will say, "fifty per cent. or more of the water is now evaporated in the fire-box; if, therefore, you dispense with that heating surface, it will be impossible for the boiler to generate as much steam, or do it as economically, as it would with it." Now suppose we ask, as Mr. Verderber did, Why does the fire-box evaporate so much more water relatively than the tube surface? In the first place the fire-box plates are directly exposed to the fire, and to a much higher temperature than the tubes. As "heat is transmitted through the heating surface of a boiler in proportion to the difference of the temperature of the products of combustion on one side and the water on the other," therefore, if the temperature in the fire-box is, say 2,300°, and the water outside is 300°, the difference in temperature will be 2,000°. If now one-half of the heat of the fire-box is transmitted before the gases enter the tubes, then the difference of temperature in the latter would be 1,150 — 300 = 850°; so that the rate of transmission in the fire-box and in the tubes would be in proportion of 2,000 to 850. Of course as the gases pass through the tubes their temperature becomes reduced more and more, and less and less heat is therefore transmitted. The experiments made by Pétiet show this clearly. He divided a locomotive boiler which had tubes 12 ft. 3 in. long into four com-

partments. He found that the evaporation per square foot of heating surface per hour was as follows:

Fire-box	36.9 lbs
1st tube section	11.44 "
2d " "	5.72 "
3d " "	3.52 "
4th " "	2.31 "

In other words, as pointed out by Mr. Verderber, the reason why less water is evaporated in the tubes per square foot of surface is because a large part of the heat is first extracted from the gases of combustion before they enter the tubes, and therefore it is impossible for the latter to extract from the former what they do not contain.

That writer also says that "there is no reason at all why the tubes should—at equal temperatures and density of the burning gases—evaporate less water per square foot of surface than the fire-box." While this is perhaps not absolutely true, yet it may be accepted as a fact in the sense in which he intended it, so that it may be said that if the heat is not absorbed from the products of combustion while in the fire-box, it will be absorbed in the tubes.

It is of course true that the total amount of heating surface is reduced if we dispense with the water spaces. The reduction in heating surface due to this cause would be about 10 per cent. of the total amount. Without water spaces, too, the boiler would have considerably less water capacity. Mr. Verderber has called attention to this, and also to the necessity of contracting the blast-orifices or exhaust-nozzles with boilers of his plan. We can hardly agree with him, though, that the evil resulting from the diminution of the water capacity would be remedied by the use of an injector working continually. The water in the boiler acts as a great receptacle in which heat is stored and from which it may be drawn in cases of necessity. Thus, when running on a level, or on easy grades, a provident locomotive runner will fill his boiler as full of water as he can without risk of priming, and heat it up to as high a temperature as possible without blowing off steam. When he reaches a heavy grade he will have this large quantity of hot water stored up, so that by partly shutting off the pump he can keep up steam, when without such a store he would be obliged to pump so much cold water into his boiler that it would "knock the steam down" at the critical moment when he needs it most. Experience will show any one that large water capacity is an important element in a locomotive boiler.

The fact that the sediment which accumulates in ordinary boilers in the water-spaces around the fire-box in the new form of construction must be collected below the tubes has led to the recommendation that a number of the lower tubes be omitted, and that a man-hole, or, what would seem to be better still, a mud-drum, be placed at the bottom of the boiler.

All these reasons indicate that in constructing boilers without water-spaces around the fire-box, it would be advisable to increase the size of the cylindrical part, so that some of the lower tubes could be omitted and yet leave room enough for a sufficient number so that the total heating surface and also the water capacity would be fully equal to that of an ordinary boiler with the usual water-spaces. This would make a larger number of tubes necessary, with a proportionate increase of sectional area, and give room for the passage of the increased volume of gases due to their higher temperature, and would probably make it unnecessary to contract the exhaust nozzles.

It is to be hoped that the experiments of Mr. Verderber will be repeated in this country at as early a date as possible, so that railroad companies here may be able to see their way clear to using what seems to be the most important improvement in locomotive construction that has been made in many years.

THE DEVELOPMENT OF PASSENGER TRAFFIC.

If there is any one thing in the history of American railroads more astonishing than the enormous development of their freight traffic, it is the stationary character of their passenger traffic. There seems to be absolutely no limit to the increase of freight traffic; in bad times it grows rapidly, in good times miraculously. Some old railroads carried last year twice as much freight as in 1872 or 1873, when business seemed wonderfully prosperous; but, excepting roads near the border, most lines carried fewer passengers in 1878 than in 1873.

We will compare below the passenger mileage of several roads for a series of years, premising that many of the roads have increased their mileage greatly from the first to the last year mentioned. The figures are for thousands of passenger miles:

This table will bear study. Compare the first and last columns for passenger traffic with the two columns for freight traffic, and note the great difference in the rate of increase in most cases. In many cases

COURSE OF PASSENGER TRAFFIC ON ELEVEN AMERICAN RAILROADS.

	PASSENGERS CARRIED 1,000 MILES.										Tons Carried 1,000 Miles.		Miles of Road.	
	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1868.	1877.	1868.	1877.
Boston & Prov.	33,633	29,963	27,128	31,134	36,403	41,224	38,925	38,744	37,948	35,995	13,648	19,150	55	694
N.Y. & N.H. & H.	124,313	128,455	133,589	148,243	156,143	164,633	160,204	155,397	163,076	170,889	585,699	1,114,586	773	957
N.Y.C. & H. R.	341,138	346,899	313,234	342,339	364,357	350,782	338,934	353,136	316,847	288,312	1,000,524	1,619,949	1,000	1,000
Pennsylvania	133,175	144,729	150,850	152,918	173,843	177,479	174,080	160,422	188,312	143,154	752,711	1,494,798	733	1,055
Phil. & Del.	48,271	54,994	56,520	57,218	61,507	64,250	67,677	65,634	104,811	59,160	17,338	42,060	207	207
L.S. & Mich. So.	45,470	52,555	56,320	40,962	83,276	85,350	93,771	99,238	93,306	1,029,746	1,080,000	1,013	1,117	1,020
Chic. & N. W.	88,808	119,804	115,457	100,863	99,290	111,072	109,135	116,770	122,281	116,902	200,420	485,358	1,153	1,502
Illinois Central	53,306	54,305	50,591	51,780	48,504	51,115	50,828	51,238	46,017	253,336	249,346	1,064	1,108	1,038
Union Pacific			73,985	80,664	95,709	105,138	132,591	128,033	107,833	134,206	334,645	1,038	1,038	

* Year 1872. † Year 1869. ‡ Year 1870. § Year 1869. The figures for C., B. & Q. freight are the number of tons carried, not thousands of ton-miles, like the rest. ¶ Year 1871.

there has been no increase in passenger traffic for many years. The nine roads reporting for 1870 had an aggregate passenger traffic of 1,097,803,000 passenger miles that year, and 1,120,447,000 in 1877, or but two per cent. more. Meanwhile, the freight traffic of the same roads increased from 3,784,704,000 ton-miles in 1870 to 6,693,539,000 in 1877, or 77 per cent. Beginning with 1872, when first there are figures from all the eleven roads in the table, they had that year a passenger traffic of 1,330,167,000 passenger miles, and in 1877 one of 1,339,922,000, or but $\frac{1}{4}$ of 1 per cent. more; yet in that same time the freight traffic of the same eleven roads grew from 5,175,797,000 to 7,067,831,000 ton-miles, showing an increase in the five years of no less than 36 per cent.

And certainly the roads selected cannot be taken as exceptionally unfavorable to growth of passenger traffic. On the contrary, the list includes several roads on the border whose passenger traffic has grown rapidly, and no account has been taken of the increase of mileage, which on one road has nearly quadrupled, and in the aggregate is very much larger in the latter than in the earlier years. Nor have we chosen years which make the comparison especially unfavorable. The year 1872, indeed, was rather exceptionally favorable to compare with, as the following statement of the aggregate passenger mileage of all eleven of the roads for six years will show:

1872.....	1,330,167,000	1875.....	1,441,055,000
1873.....	1,452,471,000	1876.....	1,647,450,000
1874.....	1,430,812,000	1877.....	1,339,922,000

If we had all the figures for 1878 the showing would doubtless be still worse, as the roads that have reported so far—the New York Central, the Erie and the Illinois Central—all show decreases, which in the aggregate amount to 9 per cent. of their 1877 traffic. We are thus putting it very mildly when we say that, generally speaking, passenger traffic does not increase. Except where a road is in or leads directly to a new country now filling up with settlers, or has greatly increased its mileage, it has generally shown a decrease in passenger traffic since 1873, and in many cases a considerable decrease, though at the same time its freight traffic often has grown enormously. The New York Central had twice as much freight traffic in 1878 as in 1872, but one-eighth less passenger traffic; the Erie had nearly a third more freight traffic, but a tenth less passenger traffic. Taking the three trunk lines together, they had 6 per cent. less passenger traffic in 1877 than in 1872, though they have had some increase in mileage, and they command by far the largest part of the great through travel between the East and the West.

Why is it that there is this great difference between the development of passenger and freight traffic? This is a question which deserves the careful study of all traffic managers, and especially of officers in charge of the passenger departments. Is there any reason why passenger traffic should remain at a standstill, and is there any way to develop it as freight traffic has been developed?

There is certainly a radical difference between the two kinds of traffic. Freight transportation is indispensable to the distribution of production; passenger traffic is so to a very much smaller extent. A very large proportion of passenger travel belongs to the luxuries rather than the necessities of life. Wealth is not created by this kind of travel; it is rather consumed. When the emigrant from the Eastern States goes with his family to Kansas to establish a farm on the raw prairie, the transportation of himself and his family may properly be regarded as a step in production; but when, having accumulated a little store, he, his wife, and his children return to visit the old home and relatives and friends, their long journey of 1,500 miles or more and back again is not and is not intended to be productive of wealth to any one; just as much will be produced and made available for consumption where it is wanted in the world without this journey as with it.

Not so with the crops he raises. The corn, wheat, cattle and hogs which he produces on his farm to be made available must be carried nearly across the con-

tinental, and very likely will be carried across the Atlantic also. Now the growth of production in this country is chiefly in farm products, and the increase in farms and farm products is chiefly beyond the Mississippi, 1,200 to 1,800 miles from the Atlantic coast where or beyond which substantially all the additional products must find a market. The average distance of farm products from their market is increasing continually, as the prairies west of the Mississippi and the Missouri produce a larger and larger proportion of the whole. Thus we have a rapid increase of production, the production of a kind that must be transported, and the average distance transported also increasing somewhat, all working together to contribute to the growth of freight traffic. On the other hand, the increase in population is much slower than that in production, the necessary traveling of the farmer west of the Missouri is little if any greater (once he has got there) than that of the New York or New England farmer, and all over the country a very large share of the travel is of a kind that may be dispensed with, and will be dispensed with when incomes fall off in hard times such as we have been having.

It therefore appears natural that freight traffic should increase much faster than passenger traffic in this country, especially under the circumstances of the past five or six years.

This does not prove, however, that passenger traffic has been developed as much as it might be. In the history of freight traffic we find new developments continually. It is not that so much more is produced, and the additional production is transported just as it always was; but articles are carried this year that never were carried before; more and more things are found to be capable of transportation, as it were—in demand somewhere at a price covering the cost of production at the place of its origin, and something more than the bare cost of transportation. Freight agents are on the look-out for traffic of this kind—something that will be a clear addition to their old business, and that will return something more than it costs. Here there is lumber which can be got out for six dollars a thousand. It is not got out because at the only available market lumber can be had from some other place by some other route for eleven dollars and a half a thousand, and the freight from the first named place is six dollars, and that but a dollar and a half over cost. If the freight agent finds this out, he offers to carry for five dollars a thousand—only half a dollar over cost—and thus tempts some one to compete in the market thus made accessible to him. The latter can now lay down lumber there for eleven dollars a thousand, while the price is half a dollar more, and there remains half a dollar of profit for the railroad—not one third of the average rate, and proper rate, of profit, very likely, but welcome as a clear addition to net revenue.

Now the growth of freight traffic to a very great extent has been due to the almost unlimited flexibility of freight tariffs, of which the above is an example. Certain goods are charged 75 cents per 100 lbs. from New York to Chicago. If the same price should be charged on sugar and coffee, and hundreds of other articles, they would not go—at least not by rail. Consequently the railroads are taking them at 30 cents per 100 lbs., or at some other rate less than 75 cents. Yet many of the first-class goods paying 75 cents per 100 lbs. are not worth any more than coffee, paying 30 cents, and do not cost the railroads a cent more for carriage. The lower rate is accepted because the higher rate cannot be had, and that is the all-sufficient reason. Somehow the fact of the classification of freight seems to drive this idea out of men's minds, and railroad men even sometimes speak of the differences in the rates on the different classes as if they were determined by differences in the cost of carriage, which they are only to a very slight extent.

Now there is nothing in passenger traffic like this classification of freight and the almost perfect freedom to make such rates as any given traffic can bear.

To a considerable extent such classification (simply and solely in proportion to the ability to pay) is impossible, from the nature of the traffic. We cannot classify men according to their incomes, and say that seamstresses earning three dollars a week shall pay the cost plus 10 per cent.; laborers at a dollar and a quarter a day, the cost plus 20 per cent., men with incomes of \$800 a year the cost plus 50 per cent., and those with \$5,000 a year double or treble the cost. Yet this is substantially what is done all the time in freight transportation, with advantage to all shippers; and if a practicable way could be found for doing something equivalent to it in passenger transportation, everybody might be made to profit by it. What is wanted is some means of inducing people who cannot afford to travel now to travel at rates which will yield some profit, and without diminishing the profits of the old traffic to as great an extent as the aggregate profits of the new traffic. This, it must be confessed, is no easy task. It requires the consideration of social customs and human prejudices, and a profound knowledge of human nature, as well as of the requirements of the various classes of the various communities that may be able to use a railroad. But the fundamental principle to be borne in mind is that any clear addition to passenger traffic is desirable which returns more than it costs, and that no passenger that pays the highest rates has any legitimate ground of complaint against practices which effect this end. The feelings of the passengers, it need not be said, must be consulted, nevertheless; we can not give to shoe-makers tickets from New York to Philadelphia for \$2 when we charge everybody else \$2.75 for precisely the same accommodations, though some such arrangement might possibly be advantageous to all concerned. For instance, in the South it would probably pay—increase the net earnings of the companies and enable them to reduce their charges to all other passengers—if negroes were carried at considerably less than the rates charged to whites. This would be a rough classification, giving a lower rate to one class because, on the average, this class is poor and will travel much more at a low than a high rate. We can imagine the outcry there would be were such a regulation made North or South. Yet the basis of the difference would be just the same as that which makes the railroad charges 30 cents per 100 lbs. for wheat and only 25 cents for corn from Kansas City to Chicago. It is just this difficulty of making a practicable classification that makes all the trouble. The things that would be easy to do, and would be effective, and very likely reasonable, we cannot do. We must seek out some means of giving our reduced rate through some limitation of times, trains, real or apparent accommodations, and the like; something that will not wound the pride or awaken the prejudices of those with whom we have to deal.

We know how the question has been met in Europe—by establishing three or four classes of cars. There travelers classify themselves. In England you may travel for two, three or four cents per mile; in continental countries the lower-class rates are usually lower, and sometimes very much lower. The feeling of equality, where it exists (as it does in France probably much stronger than in this country even) is saved by making a difference in the cars for the different classes. In hardly any case, however, is the difference in accommodations any thing like the difference in fares, and if the cars of the different classes were equally well filled, the first-class travel would be much the most profitable; the "noblemen, fools and Americans," who are said alone to patronize first-class cars, would pay a much larger share, per head, of the interest on the investment in railroads than the commoners, sensible people and Europeans who may be supposed to make use of the second and third-class cars. But all the facts we have indicate that the reverse is actually the case, and that the whole profit of the passenger business in Europe, or in most countries of Europe, is contributed by the classes below the first. This it is important to consider when discussing plans for modifying the methods of conducting passenger traffic in this country. The fact seems to be, that the class or classes in which the greatest number travel can alone be conducted profitably. The complication of an additional class, not to say two or three classes, adds materially to the expenses. There must be all the classes on all trains; and when parts of the train must be switched off for points on branches, there must be accommodations for each class in each section. In England, first-class cars often go out without a single passenger; and a train with cars of all classes, running through to three different points (two on branches), may have three first-class cars with but three first-class passengers. We have had some similar experiences with sleeping-cars, where, to make a

line, there must always be a car ready for passengers to every point to which sleeping-cars are advertised to run through, say on the Erie (merely a possible case), one going to Buffalo, one to Cleveland, one to Cincinnati, and one to Chicago, all on the same train.

The classification of cars, then, does not seem to meet the case. It develops the traffic, but not the profits from it. But it does seem to develop the traffic. Without being able to fortify the statement by statistics, we will say that European roads seem to have a heavier passenger traffic than American roads under similar circumstances, to have a more elastic passenger traffic, and to carry it (owing largely to its quantity) at a materially less cost. Precisely the reverse is the case with freight traffic, in which we seem to have little to learn, except the art of getting paid sufficiently for the work we do. The establishment of regular classes of passengers, with different kinds of cars on all or most trains, though desirable in some regards, does not seem likely to increase passenger profits in this country, whatever effect it might have upon traffic.

It seems probable that if the problem is solved in this country—and by the problem we mean the drawing out at lower but still profitable rates of a large amount of travel that does not now exist upon our roads—it must be by original methods suited to the circumstances of the country. Some suggestions on the matter will be found in the paper of Mr. Francis J. Lee, begun in the last and concluded in the present number of the *Railroad Gazette*, together with the development of a system of regularly graduated rates that may be useful in applications to passenger rates and also to freight rates. Mr. Lee is right in placing stress upon the social aspect of the question. The passenger agent must study his customers, actual and possible, and learn what they want and how they want it, and especially what they don't like and won't have. No fixed rule or system can be laid down for all roads. Nothing can take the place of the brains of the passenger agent, who, setting out with the principle that any addition of traffic at rates above cost is a good thing and admissible if it does not destroy some other source of revenue of equal profitability, if a careful observer, understanding human nature, may be able to make a great variety of plans for adding to the profits of his department by supplying undeveloped wants of the community. Mr. Lee, however, seems to us to lay too much stress upon a regular graduation in rates according to time and distance. This may be desirable frequently, but it is by no means necessary, nor is there always any basis of reason for it. In suburban traffic it costs substantially as much to carry to and from a place two miles from the city as from one 20 miles distant, if the latter is the end of the shortest train run; and if it were possible it would be much more economical to carry everybody to one place 20 miles than to drop the same number of passengers at stations two or three miles apart within the 20 miles. Suburban trains go out from the city empty all the morning and come in empty all the afternoon. If in any way a reverse current of travel could be created to fill these now empty trains going into the country in the forenoon and coming back in the afternoon—as picnic parties do—it might be greatly to the advantage of the railroads to carry it at a half or a quarter of the lowest suburban rates, even, and it would be an advantage to all concerned. Where the passengers may be carried with little or no increase of expenditure, there is scarcely any limit to the reduction of charges that may be permitted. The aim should be, first to keep the cars of the existing trains always as full as possible; second, to make the existing trains always as large as possible; finally, to get passengers for as many trains as possible. Only in the latter case will it be necessary to estimate closely the average cost of carrying passengers, for in the two former the additional cost is but a small fraction of the average cost, as we see in the "reverse current" of suburban traffic imagined. But even in the last case the additional cost may be very much less than the average cost. For instance, within 80 miles of great cities there is always a good deal of travel from the country towns to the city and back the same day, and there would be a great deal more if the rates were a great deal lower. Suppose the regular round-trip rates, good on all trains, to be \$4 for the 80 miles. The problem is to draw out additional travel at a lower rate without destroying or greatly decreasing the old established traffic. We may limit tickets to one train, but if that train leaves at the hours most convenient to the well-to-do people, it will get pretty much all the travel, and the result will be a loss of the old profit from these people. But if our low-priced train leaves the town at 5 o'clock in the morning and leaves the city at an hour later than the regular travelers like, perhaps that depends on the character of the population) the

old traffic will remain, as it was, nearly, while at very low rates there will be enough new travel developed to fill an enormous train, making the average cost exceptionally low, and making the train perhaps as profitable as any other, and at least adding something to the net profits of the road. It would not cost a cent more to haul this train at the more convenient hours, but then it would destroy the other traffic. That would make it impossible, and that is a sufficient justification of the different hours and the different rates. We had something like this on the Pennsylvania Railroad during the Centennial, where a train leaving New York very early in the morning took a passenger to Philadelphia and back for two dollars, the regular round-trip rate being, we believe, five dollars. In this case the cars were inferior and the speed very moderate; and probably, on the whole the public will be better satisfied if some such differences exist where the difference in rates is great. This would be the establishment of a second-class train instead of second-class cars on all trains.

We do not, however, venture to propose any plan. That can only be done by those who are entirely familiar with all the circumstances in each case. So far, the difficulty of making a reduced rate which will not divert other established traffic to such an extent as to make the whole passenger business less instead of more profitable than before has been so great that passenger agents are very shy in making experiments. It must be confessed that the problem is an extremely difficult one, and that the freight agents have had a much easier one, which they have made brilliant progress in solving. There are, however, many most accomplished men of great experience in their business among passenger agents, and that in their hands no greater progress has been made in developing traffic is *prima facie* evidence of the difficulty of their task. This is not, however, a reason for giving it up. We believe that a great step toward its solution will have been made when it is generally accepted that great differences in rates are permissible for approximately the same service whenever by such differences clear additions are made to the paying traffic.

Foreign Railroad Notes.

In France, during the year ending with June, 1878, just 500 miles of new railroad were opened for traffic, comprised in some thirty lines or extensions, and at the close of that year the total length of road in operation in France was 13,220 miles.

The railroads of Austria-Hungary, in 1878, earned at the average rate of \$8,870 per mile of road. Those which extend into both kingdoms averaged \$11,229 per mile, those wholly in Austria, \$9,509, and those wholly in Hungary, \$4,713. One railroad belonging to the Hungarian government earned about \$220 per mile in the year, and it does not seem to be a rapidly-improving property, for in December, 1878, its earnings were but \$22.72 per mile. The heaviest earnings were on the Emperor Ferdinand Northern road (433 miles), and were at the rate of \$28,796 per mile.

Swiss railroad stocks have fallen, of late years, in a way that holders in certain American companies will know how to appreciate. A table of prices for the five years beginning with 1874 and ending with 1878 shows that at the highest prices in that time every stock has been higher than it was on the first of January of 1874, but at the end of 1878 they were in every case very much lower—from 22 to 95 per cent. lower, and all but one as much as 42 per cent. lower. Shares of the Gotthard Railroad worth \$10,000 Jan. 1, 1874, were worth \$519 Dec. 31, 1878, and at one time were worth but \$320. The opportunities for losing money have been brilliant. The man who invested a thousand dollars in each of the eleven kinds of stocks on Jan. 1, 1874, would have been able to sell out Dec. 31 last for \$3,777 what cost him \$11,000.

A Berlin paper says in regard to one of the steps recently taken toward concentrating the railroads under the government that it is to be feared that when the private roads have ceased to exist, the state, as the sole possessor of the whole railroad traffic, will dictate much higher rates than are now had; and the fact that this can be done only through the law, and with the consent of the representatives of the nation, will afford in appearance only a protection against such an excessive increase of charges. For the administration will need, to justify the increase, only to show that the lower rates do not cover the working expenses and the interest on the cost of the roads; and as it at present works at greater expense than private enterprise, it will probably be easy to show that justification. The experience that the state is a dear and inefficient producer has been sufficiently shown in the history of our forefathers not to be learned again at so costly a price.

The Austrian rail-rolling mills have made a pool for three years. Prices are to be fixed by the central management, which will also designate the establishment which is to execute any contract. It is said that considerable expenses for transportation may be saved by giving contracts to the works nearest the place where the rails are to be used.

The Ashtabula disaster must hide its diminished head before a similar accident at Adrianople, Turkey, if the report that we read is true, that on the 11th of January the bridge there over the Arda broke down under a train loaded with

Russian soldiers, all the first and second-class cars going down into the stream and drowning or otherwise killing a Russian general, several other officers, and 200 soldiers. The engine and three third-class cars escaped.

Von Hartwich, a widely known Prussian railroad officer, has been publishing his ideas as to the cheapening of freight rates on the Prussian railroads, and he certainly takes very radical ground. He would arrange everything to suit the freight traffic solely, conduct the passenger traffic in passenger cars attached to freight trains, limit the length of the latter to 50 axes (say 23 cars), and limit their speed to seven miles an hour! In this way he says that freights which it is important to carry very cheap could be taken at the rate of 0.455 cent per ton per mile. This proposition is seriously discussed and opposed in the leading German railroad paper, the *Zeitung des Vereins deutscher Eisenbahn-Verwaltungen*, where the following statement is made:

"It is generally known and granted among railroad men that, for the sake of regularity in operation, the utilization of the motive power, and also of the reduction of working expenses, freight trains should be made as large as possible, and run as slowly as possible. For this reason almost universally engines with six wheels coupled are used for freight traffic, and a speed adopted which varies from 14 miles per hour on favorable grades to 9½ miles on steeper grades, and which may be considered, under all the circumstances, as the most advantageous speed." The writer also denies with some warmth that it will be possible to make any lower rates than now prevail in Prussia, and as to the proposed minimum rate of 0.455 cent per ton per mile, he says that "at no time and in no country has there ever been so low a rate, and, according to all experience, it seems impossible to reduce the bare cost below 0.455 cent per ton per mile." Evidently he is not familiar with American trunk-line rates. Freight enough has been carried between Chicago and New York within the past two years at 0.4 to 0.44 cent per ton per mile to break down all the cars in Europe. As to the cost, that is another thing; but evidently the trunk line managers believe that they do not lose money when they carry for the above rates, equivalent to 20 cents per 100 lbs. from Chicago to New York. It has never been reached, however, as the average cost per ton per mile of the entire traffic of any American road, though the Philadelphia & Erie has come very near it.

Mr. Stephen Verderber, General Inspector of the Royal Hungarian State Railroads, believes that he has proved that, with the present prevailing dimensions of the tubular part of a locomotive boiler, there is no need whatever of having any heating surface for the fire-box. In his experiments he took a locomotive which actually made nearly half of the steam with the heating surface of its fire-box, and then isolated the fire from the old heating surface of the fire-box by means of an air space through which a current of air was maintained shut off from the fire by a non-conducting partition. The performance of the engine under these circumstances was substantially unchanged. Afterward he renewed a worn-out copper fire-box by one made of fire-brick masonry, and long and careful experiments were made with this engine, and one altogether similar but with an ordinary copper fire-box, the result being an average evaporation of 4.55 lbs. of water per pound of coal (brown coal or lignite) in the locomotive which evaporated wholly from the tube surface, and of 4.62 lbs. per pound of coal for the other boiler, the difference being so small as to make it altogether uncertain whether it was due to the difference in the fire-boxes. Verderber says that when no heat is imparted through the walls of the fire-boxes, the gases of combustion reach the tubes in greater volume and at a much higher temperature. The experiments were suggested by the great injury to the costly copper fire-boxes by incrustations deposited by the bad Hungarian water. In the boiler which had no fire-box heating surface the incrustations were heavy, but they were wholly in the first third of the length of the tubes. Verderber concludes that where an increase in evaporating capacity is required it is not necessary to increase the heating surface of the fire-box, as the end may be attained by increasing the heat in the tubes and for a greater distance in the tubes.

Boston & Albany and Boston & Providence Consolidation.

The negotiations for the use of the Boston & Providence station in Boston by the Boston & Albany road have developed into a proposition for the consolidation of the two companies, and the matter has progressed so far that an enabling act was this week introduced in the Massachusetts Legislature. From present appearances it will meet with little or no opposition, and it is understood that it has the approval of the Railroad Commissioners. The main object of the consolidation, if it is completed, will be the joint use of the Boston & Providence depot, which the Boston & Albany hesitates to enter unless it can have control. The Boston & Albany passenger station has long been insufficient, while the Providence depot is probably the finest and most complete in America, and is in excess of the present requirements of the road, having really ample conveniences for both roads. It represents a very considerable part of the invested capital of the company, and is a considerable burden for a road only 44 miles long, even though it has a great passenger traffic. Its joint use presents the further advantage of avoiding a troublesome and dangerous grade crossing, which has for years been an annoyance to both roads.

Outside of this terminal question the two roads have really very little in common. They do not interfere with each other locally, and come into competition only on the New York-Boston, and to a small extent the Boston-Western business. The consolidation would give the Boston & Albany control of the Boston end of both the all-rail routes between

the two cities, as the New Haven Company controls the New York end of both lines, and would also give it for the first time an interest in two of the rail and boat lines, perhaps leading to some changes in that very considerable business. Naturally the Boston & Albany would be the controlling element in the consolidated company, in view of its greater capital and length of road. Both companies are financially strong, though the debt of the Providence Company is a little larger in proportion to its stock than that of the Albany. Both have been able to maintain dividend payments, though the Providence stockholders now receive 6 per cent. to the Albany 8, but there is nothing in the condition of either to hinder the consolidation.

Probably very little difference would be made in the working of the two roads. Naturally distinct lines, with a distinct business, they must be to a great extent worked separately, though some saving could probably be effected in the general management expenses. Some conveniences in the way of through cars could be given, which might secure a part of the business going West from Providence, but not enough to increase the traffic of either line to a considerable extent. The consolidated company would have about 390 miles of road, and would stand for length of road second to the Old Colony alone among Massachusetts companies, but with much larger earnings and a heavier investment than the Old Colony, which has a good deal of road with light earnings, but which has also a much less costly road, with comparatively small terminal investments.

January Earnings.

January earnings are reported in our table for 31 railroads, with 19,921 miles of road, which is nearly a quarter of the total in operation in the United States. These railroads, with 3.4 more miles of road than in January, 1878, earned 2.3 per cent. less money, their average earnings per mile having fallen from \$500 to \$473, or 5.4 per cent. Of the 31 roads reporting, 21 have smaller earnings than last year. The large increases in earnings per mile are 61.7 per cent. on the Atchison, Topeka & Santa Fe, 46.2 on the Cairo & St. Louis (still very small), 42 per cent. on the Philadelphia & Reading, 20.9 on the Belleville line, 19.1 on the International & Great Northern, 16.6 on the Galveston, Houston & Henderson, and 13½ per cent. on the Chicago & Alton. The large decreases are 31.5 per cent. on the Chicago, Milwaukee & St. Paul, 30.8 on the Burlington, Cedar Rapids & Northern, 30.1 on the Mobile & Ohio, 27.5 on the Great Western, of Canada, 27.2 on the Toledo, Peoria & Warsaw, 26.5 on the Iowa lines of the Illinois Central, and 23.7 on the Indianapolis, Bloomington & Western. It has thus been a month of very different prosperity for different roads.

To show better the course of earnings, we give below, for as many roads as we can, the earnings per mile of road in January of each of the past six years. In this list there are reports from 28 roads for three years, from 23 for four years, from 18 for five years, and from 8 for six years.

January Earnings per Mile of Road.

	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Atch., Top. & Santa Fe	\$359	\$222	\$190	\$187	\$187	\$187	\$187
Burl., C. R. & North	270	390	201	220	249	255	255
Cairo & St. L.	110	75	125	149	...	...	...
Central Pacific	524	537	717	750	746	673	673
Chicago & Alton	504	444	518	470	492	...	...
Chic., Mil. & St. Paul	342	499	268	377	333	...	...
Chicago & N. W.	484	519	480	538	549	...	...
Cleve., Mt. V. & Del.	185	185	108	185	...	...	...
Grand Trunk	610	614	536	...	...	...	...
Great Western	736	1,016	584	...	...	...	...
Hannibal & St. Joseph	464	462	390	...	...	...	...
Ill. Cen., Ill. lines	528	596	520	603	...	...	...
Ill. Cen. Iowa lines	250	341	232	317	...	...	...
Ind., Bloom. & West.	208	351	269	388	339	441	441
Int. & Gr. North	311	261	351	369	268	343	343
Kansas Pacific	267	265	208	273	314	224	224
Memphis, Pad. & N.	134	144	131	187	...	...	...
Mo., Kan. & Tex.	247	276	302	326	252	339	339
Mobile & Ohio	391	516	440	440	373	...	...
Nash., Chat. & St. L.	451	509	441	508	436	...	...
Phila. & Reading	1,197	832	1,387	...	...	...	...
Belleville Line	683	564	724	549	806	544	544
St. L., Iron Mt. & S.	484	548	551	478	396	375	375
St. L., Kan. City & N.	484	499	453	488	413	...	...
St. L. & S. E.	233	243	255	232	242	...	...
Tol., P. & Warsaw	400	550	332	419	301	408	408
Union Pacific	683	609	781	604	550	...	...
Wabash	454	562	502	...	...	...	...

It will be seen that of the 21 roads in this list whose earnings were smaller in 1879 than in 1878, as many as nine still had larger earnings in 1879 than in 1877. That is, in January, 1879, 16 out of the 28 roads had larger earnings than in the corresponding month of 1877, only five out of 23 had larger earnings than in 1876, eleven out of 18 larger than in 1875, and four out of eight larger than in 1875. Considering the fact that the currency in which the earnings are reported was at a discount in all previous years, it cannot be said that the returns this year are unfavorable, though they do not show any general improvement. Reducing to gold values, the average earnings per mile of the 31 roads reporting for January were about \$487 last year, against \$473 this.

All the roads affected by the bad spring wheat crop in Wisconsin, Minnesota and Northern Iowa show decreases in earnings, and three out of the four show a very large decrease. Still all four of them show larger earnings than in 1877. Three out of four roads running into Chicago earned less than last year, and three out of five running into St. Louis. As to trunk-line traffic, there is nothing to judge from except the two Canada roads, which show decreases—the Great Western an enormous one, doubtless due largely to the snow blockade in the vicinity of Buffalo. About one-half of the whole mileage reporting is west of the Mississippi, and the Reading is the only Eastern road of the United States whose earnings are given in the report.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Chicago, Burlington & Quincy.—The *Chariton & Indianola* Branch is completed by an extension north by west to Indianola, Ia., 6 miles.

This is a total of 6 miles of new railroad, making 86 miles reported thus far this year.

THE ATLANTIC & GREAT WESTERN is again reported leased to the New York, Lake Erie & Western, which means, we suppose, that the English reorganization trustees agree to and recommend a lease on terms offered them while they were in this country last fall; for we believe that neither they nor any other body of men save the bondholders themselves, have any authority to make a valid contract for a lease. These trustees were chosen several years ago to carry out a foreclosure and reconstruction scheme which, after some trouble, a majority of the bondholders had been prevailed upon to accept, but they have made no progress with this scheme, because, as time passed, it became evident that it could not be carried out, and the only safety of these bondholders was to leave the property in the Receiver's hands, for the earnings have been but a trifle more than the expenses, a large Receiver's debt must be provided for at the time of a foreclosure sale, and, worse than all, the principal of the Ohio mortgage for about \$2,400,000 is already overdue two and a half years, and this mortgage is the first lien on all that part of the road in Ohio, and the holders under it are not a party to the reorganization scheme, it having always been intended to meet their claims in full. To pay this mortgage with the five or six overdue coupons on the bonds, and the Receiver's debts, will require a pretty good sum of money, which the English bondholders have no means of raising, the credit of the road being absolutely nothing, since it has been found unable to earn interest on the trifling Ohio mortgage, which is only about one-twenty-fifth of the whole funded debt. If there had been much faith in the value of the property it is likely that it would have been acquired by some connecting line before this time; for the foreclosure of the Ohio mortgage and the payment of the Receiver's debt would apparently have secured all the property in Ohio, and the Ohio bonds have been very far below par. No one has seemed to think it worth the while to do this, though a comparatively small sum of money would have sufficed.

The terms of the lease are said to provide that the New York, Lake Erie & Western shall provide for the Ohio mortgage and the Receiver's debts, and pay a proportion of the gross receipts as rental. The proportion named is much greater than the Atlantic & Great Western has been able to earn net for many years. Doubtless the New York, Lake Erie & Western can profit more by the road than any one else, at least so long as it remains of 6-ft. gauge. It will be important to change the Atlantic & Great Western's gauge, however, at an early day. The New York, Lake Erie, & Western, with the great stock of new cars that it has ordered, would doubtless be able to dispense with most of the large stock of United States Rolling Stock Company cars which the Atlantic & Great Western has been using for many years. It will hardly gain much new traffic by the lease, for it has always had pretty much all that the Atlantic & Great Western had to give, from the necessities of the case, there being no other connection of the same gauge. It will be a considerable advantage to it, however, to have a Western connection under its control, and without a lease there was always danger that the New York Central would secure the road, which, with the gauge changed, could interchange New England traffic with it better than and New York traffic about as well as the Erie. It would be better for the latter if it could get a line from Buffalo to Chicago, but the Atlantic & Great Western is all that there is left now, of its immediate connections with the West.

According to a telegram from London, dated Wednesday of this week, a meeting of bond and shareholders was to be held the next day to consider the proposition for a lease. Mr. James McHenry, who has (or had) an enormous holding of the shares and bonds of the company and has bitterly opposed the present Erie management, announces that he will oppose the lease, and will call a meeting to organize the opposition. He joined the arrangement under the reconstruction trustees some years ago, but afterward denounced it. Formerly he seemed to control the policy of the company, but latterly other holders do not always follow his lead.

THE PULLMAN PALACE CAR COMPANY has been the subject of an investigation by a sub-committee of the railroad committees of the Illinois Legislature, in accordance with the request of the President of the company, Mr. George M. Pullman, which we published last week. The formal report of this sub-committee has not been made as yet, but before leaving Chicago the committee passed the following resolutions:

"WHEREAS, This committee have had every facility offered it by the President and officers of the Pullman Palace Car Company for a thorough investigation of its complicated system of business; and

"WHEREAS, We have carefully examined the books and accounts and verified the statements made by the company to us; and

"WHEREAS, We have found by such investigation that the receipts of said car company yield but 8 per cent. on the capital invested, after allowing what appears to us a reasonable per cent. for the depreciation of the property employed. Be it therefore,

"Resolved, That one or more members of this committee be appointed to prepare a more detailed statement and report for our examination and confirmation."

The committee also made some inquiries at the headquarters of the Chicago, Rock Island & Pacific Company,

which owns the sleeping cars that it runs, though it had not been invited to investigate it. This company did not keep a separate account of sleeping car expenses, but Mr. Riddle, the President, said that if it were not for competition the company would discontinue running them, and of the dining cars which the company is running, he said that it was susceptible of proof that they were running behind many hundreds a year. In closing, Mr. Riddle gave expression to a sentiment which doubtless echoes the feeling of many other railroad managers. "Yes, gentlemen," said he, replying to a question; "I should say we actually lose something by running the cars. We feel that they bring business to us that we might not get without, but when we give attention to the expenses of the system as such, and to a fair return on the investment, I think we are losing money."

Considering the small average number of passengers per car on many lines, and the smaller actual capacity of the sleeping-car than that of the ordinary car on all lines, there can hardly be any doubt that the occupants of these cars, who are chiefly the well-to-do travelers, contribute much less to the profits of the owners of cars and roads taken together than do ordinary travelers. But the system having been introduced, and being almost indispensable in this country of magnificent distances, the way is not clear to change it so as to make it more profitable. We seem to be repeating the experience of Europe, where often it is questionable if first-class travel pays expenses, and where, except perhaps on a few lines where the first-class travel is exceptionally heavy, certainly the proportion of expenses to receipts is much greater than with the lower classes. Sleeping-car passengers here, like first-class passengers abroad, have less ground for complaint as to the price of the accommodations they get than any other travelers. The tendency seems to have been all along to make the best way of traveling more and more comfortable and elegant without securing payment for the cost of the improvements from those who use them.

THE PROHIBITION OF CHINESE IMMIGRATION may, it appears, have a considerable effect on the through Pacific railroads, by reducing the profits of the Pacific steamers to such an extent as to compel them to abandon the route. The *New York Commercial Bulletin* shows that since April last there has been so great a reduction in rates by the Suez Canal route that the importation last season of Japan teas at New York by the Pacific Mail and railroad route has dwindled continually, while those by the Suez Canal have been comparatively well maintained, the figures for the different months being, in pounds:

	By Pacific.	By Suez Canal.
May	173,089	837,353
June	534,525	2,446,129
July	931,960	2,893,261
August	...	2,439,908
September	451,743	1,233,008
October	32,826	1,564,791
November	15,250	603,835
December	...	490,665
January	...	591,679
Total	2,139,883	13,086,224

The difference in charges by the two routes, however, is so great that it does not appear that Chinese immigration could preserve the business to the Pacific steamers. The *Bulletin* gives the rates on raw silk and teas, the two principal imports from Japan, at about 8 cents gross and 9 cents net per pound for silk by the Pacific route, against 1½ to 2 cents gross, and 2 to 2½ cents net by the Suez route, and for tea 3 to 4 cents gross and 4 to 5 cents net per pound by the Pacific route, and 1½ to 2½ cents net by the Suez route. The latter rates, however, could hardly be met by the Pacific route, even if the Pacific steamers carried from Japan to San Francisco for nothing. The railroads can hardly afford to carry such a freight as tea some 3,300 miles for \$1.50 to \$2.50 per 100 lbs. If the Pacific railroads depended on the trans-Pacific freight for any considerable part of their profits, they would certainly be in a bad way. At the rates named, the gross receipts of the steamers, Pacific railroads and other railroads on the New York tea importations from Japan were not more than \$85,000 last season. But it is not generally understood how very small a proportion of the traffic of the Pacific railroads crosses the Pacific Ocean.

The cheapness of freights by the Suez Canal is due to a great surplusage of tonnage in the Indian Ocean, and it is not probable that it will continue. Steamer and all ocean vessel rates tend to equalization, as when one route becomes more profitable than another it is easy to withdraw vessels from the less profitable and put them on the more profitable route.

EAST-BOUND RATES have been forced down by the competition of the roads at Chicago, and the appearances are that most of the freight is now taken on the basis of about 20 cents per 100 lbs. from Chicago to New York for grain and flour, and 25 cents for provisions, against about 25 and 30 cents, which until this week appear to have been the prevailing rates actually received most of this winter. That is, the railroads are carrying at 15 cents per 100 lbs. less than the tariff of Nov. 25, which has been the nominal tariff since that date, instead of taking 10 cents less. The 20-cent rate must be very near the bare cost of transportation, and some of the most careful students believe it to be below rather than above the cost of carrying through freight. At this time of the year, when rates are once down—on grain, at least—there is little hope of restoring them before fall. The opening of navigation is not more than two months distant—perhaps a month nearer, for the Straits of Mackinac have been remarkably free of ice this year, so much so that open boats have crossed in February—and if the shippers cannot get satisfactory rates by rail, they will hold until the vessels can take it. Against this, however, we

TABLE OF TICKET RATES VARYING REGULARLY WITH DISTANCE AND TIME WITHIN WHICH IT IS TRAVELED.

		MILES PER WEEK.																							
		Miles in one month of 4.34 weeks.....		Miles in two months of 8.67 weeks.....		Miles in three months of 13 weeks.....		Miles in four months of 17.34 weeks.....		Miles in five months of 21.67 weeks.....		Miles in six months of 25 weeks.....		Miles in seven months of 30.34 weeks.....		Miles in eight months of 34.67 weeks.....		Miles in nine months of 39 weeks.....		Miles in ten months of 43.34 weeks.....		Miles in eleven months of 47.67 weeks.....		Miles in twelve months of 52 weeks.....	
		Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.
5.	Rate per mile.....	2.50	2.45	2.40	2.35	2.30	2.25	2.20	2.15	2.10	2.05	2.00	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	
	Miles.....	21.70	43.35	65	86.70	108.35	130	151.70	173.35	195	216.70	238.35	260	281.70	303.35	325	346.70	368.35	390	411.70	433.35	455	476.70	498.35	
6.	Rate per mile.....	2.48	2.43	2.38	2.33	2.28	2.23	2.18	2.13	2.08	2.03	1.98	1.93	1.88	1.83	1.78	1.73	1.68	1.63	1.58	1.53	1.48	1.43	1.38	
	Miles.....	26.04	52.02	78	104.04	130.02	156.02	182.04	208.02	234	260.04	286.02	312	338.04	364.02	390	416.04	442.02	468	494.04	520.02	546.04	572.02	598.04	
7.	Rate per mile.....	2.46	2.38	2.28	2.19	2.10	2.02	1.95	1.85	1.80	1.77	1.75	1.74	1.73	1.72	1.71	1.70	1.69	1.68	1.67	1.66	1.65	1.64	1.63	
	Miles.....	30.38	60.69	91	121.38	151.69	182	212.38	242.69	273	303.38	333.69	364	394.38	424.69	455	485.38	515.69	546	576.38	606.69	637	667.38	697.69	
8.	Rate per mile.....	2.44	2.33	2.22	2.11	2.00	1.85	1.80	1.76	1.74	1.73	1.72	1.71	1.70	1.69	1.68	1.67	1.66	1.65	1.64	1.63	1.62	1.61	1.60	
	Miles.....	34.72	69.36	104	138.72	173.36	208	242.72	277.36	312	346.72	381.36	416	450.72	485.36	520	554.72	589.36	624	658.72	693.36	727.72	762.36	796.72	
9.	Rate per mile.....	2.42	2.39	2.36	2.33	2.30	2.27	2.24	2.21	2.18	2.15	2.12	2.09	2.06	2.03	2.00	1.97	1.94	1.91	1.88	1.85	1.82	1.79	1.76	
	Miles.....	39.06	78.03	117	156.06	195.03	234	273.06	312.03	351	390.06	429.03	468	507.06	546.03	585	624.06	663.03	702	741.06	780.03	819.06	858.03	897.06	
10.	Rate per mile.....	2.40	2.25	2.10	1.95	1.75	1.70	1.63	1.53	1.50	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	
	Miles.....	43.40	86.70	130	173.40	216.70	260	303.40	346.70	390	433.40	476.70	520	563.40	606.70	650	693.40	736.70	780	823.40	866.70	910	953.40	996.70	
11.	Rate per mile.....	2.38	2.20	2.04	1.90	1.70	1.65	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	
	Miles.....	47.74	95.37	143	190.74	238.37	286	333.74	381.37	429	476.74	524.37	572	619.74	667.37	715	762.74	810.37	858	905.74	953.37	1001	1048.74	1096.37	
12.	Rate per mile.....	2.36	2.17	1.98	1.75	1.65	1.57	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	
	Miles.....	48.08	96.16	144	208.08	256.08	304	352	400.08	448.08	496.08	544.08	592.08	640.08	688.08	736.08	784.08	832.08	880.08	928.08	976.08	1024.08	1072.08	1120.08	
13.	Rate per mile.....	2.34	2.13	1.89	1.68	1.60	1.55	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	
	Miles.....	56.42	112.71	171	228.42	281.71	338	394.42	450.71	507	563.42	619.71	676	732.42	788.71	845	901.42	957.71	1014	1070.42	1126.71	1183	1239.42	1295.71	
14.	Rate per mile.....	2.32	2.09	1.85	1.64	1.55	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	
	Miles.....	60.76	121.38	182	242.76	303.38	364	424.76	485.38	546	606.76	667.38	728	788.76	849.38	910	970.76	1031.38	1092	1152.76	1213.38	1274	1334.76	1395.38	
15.	Rate per mile.....	2.30	2.05	1.80	1.60	1.52	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	
	Miles.....	65.10	130.05	195	260.10	325.05	390	455.10	520.05	585	650.10	715.05	780	845.10	910.05	975	1040.10	1105.05	1170	1235.10	1300.05	1365.10	1430.10	1495.05	
16.	Rate per mile.....	2.28	2.01	1.75	1.56	1.48	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	
	Miles.....	69.44	138.73	208	277.44	346.73	416	485.44	554.73	624	693.44	762.73	832	901.44	970.73	1040	1109.44	1178.73	1248	1317.44	1386.73	1456	1525.44	1594.73	
17.	Rate per mile.....	2.26	1.97	1.70	1.52	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	
	Miles.....	73.78	147.39	221	294.78	363.39	432	500.78	569.39	638	707.78	776.39	845	914.38	982.99	1052	1120.78	1189.39	1258	1326.78	1395.39	1464	1532.78	1601.39	
18.	Rate per mile.....	2.24	1.93	1.65	1.47	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	
	Miles.....	78.12	156.06	234	312.12	390.06	468	546.12	624.06	702	780.12	858.06	936	1014.12	1092.06	1170	1248.12	1326.06	1404	1482.12	1560.06	1638.12	1716.12	1794.06	
19.	Rate per mile.....	2.22	1.90	1.60	1.45	1.41	1.40	1.39	1.38	1.37	1.35	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	
	Miles.....	82.46	164.73	247	329.46	411.73	494	576.46	658.73	741	823.46	905.73	988	1069.46	1151.73	1234	1315.46	1397.73	1479	1560.46	1642.73	1724	1805.46	1887.73	
20.	Rate per mile.....	2.20	1.85	1.58	1.43	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	
	Miles.....	86.80	173.40	260	346.80	433.40	520	606.80	693.40	780	866.80	953.40	1040	1126.80	1213.40	1300	1386.80	1473.40	1560	1646.80	1733.40	1820	1906.80	1993.40	
21.	Rate per mile.....	2.18	1.80	1.50	1.41	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	
	Miles.....	90.14	180.28	270	360.14	450.28	540	630.14	720.28	810	901.14	991.28	1082	1171.14	1261.28	1352	1441.14	1531.28	1622	1711.14	1801.28	1892	1981.14	2071.28	
22.	Rate per mile.....	2.16	1.75	1.48	1.39	1.37	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	
	Miles.....	94.48	188.74	283	381.48	476.74	575	674.48	773.74	873	972.48	1071.74	1171	1270.48	1369.74	1470	1569.48	1668.74	1769	1867.48	1966.74	2067	2166.48	2265.74	
23.	Rate per mile.....	2.14	1.72	1.46	1.37	1.36	1.33	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16	
	Miles.....	98.82	197.41	296	395.82	494.82	593	692.82	791.82	891	990.82	1089.82	1189	1288.82	1387.82	1488	1586.82	1685.82	1785	1884.82	1983.82	2083	2182.82	2282.82	
24.	Rate per mile.....	2.12	1.65	1.41	1.35	1.34	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16	1.15	
	Miles.....	103.16	206.08	312	416.16	520.08	624	728.16	832.08	936	1040.16	1144.08	1248	1352.16	1456.08	1560	1664.16	1768.08	1872	1976.16	2080.08	2184	2288.16	2392.08	
25.	Rate per mile.....	2.10	1.60	1.42	1.33	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16	1.15	1.14	1.13	1.12	
	Miles.....	107.50	214.75	322	433.50	541.75	650	758.50	866.75	975	1083.50	1191.75	1300	1408.50	1516.75	1626	1734.50	1842.75	1952	2060.50	2168.75	2277	2385.50	2493.75	
26.	Rate per mile.....	2.08	1.58	1.40	1.22	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16	1.15	1.14	1.13	1.12	1.11	
	Miles.....	111.84	223.28	338	455.84	569.28	683	796.84	910.28	1024	1137.84	1251.28													

The average load per car on fifteen roads reporting was 21.40 passengers, or 7.54 tons freight. On twenty-one roads the average freight train load was 107 tons. The average passenger journey was 31.33 miles; receipt per passenger per mile, 3.18 cents.

The earnings and expenses of all the roads reporting were as follows:

Gross earnings.....	\$105,466,734.29
Working expenses (58.28 per cent.).....	\$61,462,471.78
Taxes (3.52 per cent.).....	3,719,406.07
Net earnings.....	\$40,284,855.84

These net earnings are 5.7 per cent. upon the whole amount of stock and debt reported.

The Commissioners close this portion of their report as follows:

"In our report of last year we called attention to embarrassments of the commission, occasioned by the unsettled question of the constitutionality of the act of 1873, to prevent extortion and unjust discrimination in the rates charged for transportation of passengers and freights on railroads in this state. This question has been before the Supreme Court several years, and before it has been decided the Commission cannot effectually accomplish the purpose of its creation. If the act of 1873 shall be sustained, the Commission can then go into the courts, if compelled to do so in the enforcement of that act, with resulting great benefit to the public; but we have determined that, pending the action of the Supreme Court in this matter, it would be unwise as well as uselessly expensive to the people, to resort to the courts in any except extreme cases. Consequently we have adopted the policy of arbitrating between their complaining patrons and the railroad corporations. We are enabled to report satisfaction with the result. In almost every instance the Commission has succeeded in settling complaints to the satisfaction of the parties thereto. The railroad corporations have promptly corrected abuses whenever called by us to their attention. A case of recent development, in which three companies are involved and which is now being considered by us, may, however, require a resort to the law; but we hope that, even in this controversy, we shall succeed in doing speedily by arbitration what may be done tardily and expensively in the courts.

"That generally satisfactory results have attended the efforts of the Commission acting as a board of arbitration suggests the probability that, after the railroad law of 1873 shall have been approved by the Supreme Court, the railroad corporations will speedily adjust themselves into harmony with the railroad legislation of the state.

"In this connection we may say that some of the complainants against railroad corporations seem to desire to make use of the Commission to extort from the roads they complain of special favors for themselves. Apparently they submit their complaints, believing that the Commission will act as a sort of constabulary, and move at their direction without ascertaining the truth or weight of their charges. Cases of this kind, when examined, place the complainants in a not very enviable light, and usually developed the fact that they have had at some time advantages that made them the recipients of the results of discriminations in their favor. It should be generally known that the Commission, while recognizing its duty to use all possible means necessary to protect the people from extortions and unjust discriminations, does not believe it should wantonly crusade against any of the railway corporations of the state. We believe these corporations, as well as the public, have rights that ought to be respected.

"Pooling combinations have been established at many of the competing points of the state. Our attention has been directed to this fact, but we have taken no legal steps to break these combinations. We have no authority to do so. It is true they have for their object the maintenance of higher rates than could exist if competition were permitted to operate without restriction, and in this way they deprive the public of a benefit it claims the right to enjoy—the lowest railroad rates free competition can create; but combinations of this kind are not prohibited by law. If, however, by such combinations railroad rates should be made unreasonably high, or if the pooling corporations should unjustly discriminate in favor of or against any person or place, the parties to the combination could then be reached for punishment under the provisions of the act to prevent extortion or unjust discriminations. But the Commission has no information of a reliable character that any of the 'pools' have charged unreasonable rates. On the contrary, our information is that in most cases the pool gates have been below the schedule rates fixed by this Commission. Under this state of facts we have been unable to do anything to prevent or prohibit pooling, and we do not believe that a discussion of the subject in this report would lead to any good results."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Wabash, special meeting at Toledo, O., April 24, to vote on the question of authorizing a new general mortgage for \$2,000,000.

Pennsylvania, annual meeting, at Musical Fund Hall, Philadelphia, March 11, at 10 a. m.

Dividends.

Dividends have been declared as follows:

North Brookfield, 2 per cent., from the net earnings of last year.

Chicago & Northwestern, 1½ per cent., quarterly, on the preferred stock, payable March 24.

Foreclosure Sales.

The *Pemberton & New York* road will be sold at Long Branch, March 31, by I. S. Buckelew, Receiver, under a decree of the Court of Chancery of New Jersey. The road is 18½ miles long, from Pemberton, N. J., to Whiting Junction on the New Jersey Southern. The road was built several years ago and leased to the New Jersey Southern, which worked it until last July, when a receiver was appointed. The bonds were guaranteed by the United New Jersey, and the interest has been paid by that company, or by the Pennsylvania, which assumed the guarantee when it leased the New Jersey lines. The foreclosure, we believe, has been sued out on the coupons paid and held by the guarantor.

The *Cherokee* road in Georgia is advertised for sale a second time. It is stated by local papers that this sale is only for the purpose of perfecting the former one; also that the road will be bought by the Cherokee Iron Company, which has a large property on the line.

Roadmasters' Association.

An enthusiastic meeting, at which a large number of roadmasters were present, was held in Greenfield, Mass., Feb. 6. Mr. L. J. Spaulding, of the Fitchburg Railroad, was chosen President, and Mr. George T. Wiswell, of the Troy & Greenfield and Hoosac Tunnel, Secretary. The subject discussed

was the propriety of forming a Roadmasters' Association, for the general dissemination of railroad knowledge and the mutual benefit of the roadmasters and the railroads which they represent.

It was resolved to hold a further meeting in Boston, March 25, and a committee was appointed to prepare a constitution and by-laws, to be submitted at that meeting.

It is earnestly desired that all the railroads shall be represented in the new association. The Secretary has been instructed to send notice of the adjourned meeting to all roadmasters in the United States and Canada, but with the limited time allowed, and the difficulty of finding the names of the proper officers on every road, some may be omitted, but all are invited to attend. The Secretary's address is George T. Wiswell, Shelburne Falls, Franklin County, Mass.

Doubtless such an association will be of much benefit, both to the members and their roads.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—The following order is dated Feb. 12:

"On and after Feb. 12, the Denver & Rio Grande Railway will be operated as a division of the Atchison, Topeka & Santa Fe Railroad, and will be known as the Denver & Rio Grande Division, and be in charge of Mr. W. W. Borst, as Division Superintendent; head-quarters at Denver.

The jurisdiction of the General Passenger and General Freight Departments of the Atchison, Topeka & Santa Fe Railroad will be extended over the Denver & Rio Grande Railway, and all orders from the heads of these departments will be respected accordingly.

The jurisdiction of Geo. O. Manchester, Assistant General Manager, and A. A. Robinson, Chief Engineer of the Atchison, Topeka & Santa Fe Railroad, is hereby extended over the Denver & Rio Grande Railway."

Boston & Albany.—The Massachusetts Legislature has chosen Jarvis N. Dunham, Francis B. Hayes and D. N. Skilling directors in this company.

Brattleboro & White Hall.—At the annual meeting in Brattleboro, Vt., Feb. 19, the following were chosen: Directors, A. B. Bailey, M. S. Colburn, M. Davidson, A. J. Dexter, F. Goodhue, A. P. Graham, William Harris, A. C. Howard, J. L. Martin, J. W. Melendy, Luther Osgood, O. L. Sherman, A. Stoddard, C. F. Thompson, E. L. Waterman; Auditors, J. H. Phelps, J. M. Tyler, S. M. Waite. The board elected C. F. Thompson, President; J. E. Butler, Treasurer.

Chicago, Milwaukee & St. Paul.—The position of Assistant General Passenger and Ticket Agent has been abolished, and Mr. F. W. Spear assigned to duty in another department. Mr. A. F. Merrill has been appointed Chief Clerk of the Passenger Department.

Cincinnati & Evansville.—The directors of this new company are: Joseph Kinsey, Oliver Kinsey, H. P. Mann, Cincinnati; Wm. R. Clark, George R. Eager, Boston.

Cleveland, Mt. Vernon & Delaware.—At the annual meeting in Columbus, O., Feb. 26, the following directors were chosen: D. W. Caldwell, Columbus, O.; M. White, Gambier, O.; Isaac Harpster, Millersburg, O.; Wm. M. Orr, Orrville, O.; Samuel Israel, Charles Cooper, Mt. Vernon, O.; Thomas D. Messler, Wm. Thaw, Pittsburgh; George B. Roberts, Philadelphia. The board re-elected Thomas D. Messler, President; J. S. Davis, Secretary; J. D. Thompson, Treasurer.

Delaware, Lackawanna & Western.—At the annual meeting in New York, Feb. 25, Samuel Sloan was re-elected President, with the following board of managers: Wm. E. Dodge, Moses Taylor, Percy R. Pyne, Wilson G. Hunt, F. W. Holbrook, George Bliss, E. S. Higgins, New York; S. B. Chittenden, Brooklyn, N. Y.; John Brislin, A. L. Dennis, Newark, N. J.; Wm. Walter Phelps, Teaneck, N. J.; Wm. Ryle, Paterson, N. J.; John I. Blair, Blairstown, N. J.; George Buckley, Southport, Conn. The only new manager is E. S. Higgins, who succeeds Benjamin G. Clarke. The board re-elected Frederick H. Chambers Secretary; Frederick H. Gibbens Treasurer.

East Broad Top.—At the annual meeting in Philadelphia last month W. A. Ingham was re-elected President, with the following directors: Franklin A. Conly, Charles Hacker, G. B. Markle, Ario Pardee, E. Roberts, Jr., P. Roberts, E. R. Wood.

Grayville & Mattoon.—Mr. E. B. Phillips, of Chicago, has been appointed Receiver, in place of J. D. Herkimer, resigned.

Indianapolis, Bloomington & Western.—The United States Circuit Court has appointed Mr. W. H. Smith Receiver of the Western Extension, for the purpose of closing up the business connected with the foreclosure of that part of the line.

Intercolonial.—The following appointments are announced: C. Schreiber to be Engineer-in-Chief and to have charge of the department at Ottawa; David Pottinger to be General Superintendent, with office in Moncton, N. B.; P. S. Archibald, Resident Engineer, with office in Moncton; James Coleman, Superintendent Halifax & St. John Division, with office in Moncton; Luther Archibald, General Storekeeper (to succeed Mr. Pottinger), with office in Moncton. George Taylor, General Passenger and Freight Agent, office at Moncton; E. T. Trites, Paymaster, office at Moncton; George P. Black, General Traveling Agent, office at Halifax, N. S. Mr. Busby remains Superintendent of the Northern Division, with office at Rimouski, P. Q.

Lake Shore & Michigan Southern.—Mr. E. B. Jacobs has been appointed Roadmaster of the Buffalo Division, in place of Hiram Washburn, deceased.

Lehigh Coal & Navigation Co..—At the annual meeting in Philadelphia, Feb. 25, E. W. Clark was re-elected President, and the following managers chosen: Francis R. Cope, Francis C. Yarnall, Fisher Hazard, Charles Parrish, Charles Wheeler, George Whitney, John Leisenring, James M. Willcox, Edward Lewis, T. Charlton Henry, Samuel Dickson.

Louisville, New Albany & St. Louis.—At the annual meeting in New Albany, Ind., Feb. 12, the following directors were chosen: St. John Boyle, Edward Cummings, Charles Warren, B. H. Young, G. C. Cannon, J. B. Winstanley, Bluford Wilson, Samuel Bayard, Robert Bell. The board elected St. John Boyle, President; G. C. Cannon, Vice-President; George Lyman, Secretary and Treasurer.

Midland, of Canada.—At the annual meeting in Port Hope, Ont., Feb. 18, the following directors were chosen: Lewis Ross, Port Hope, Ont.; George A. Cox, Peterborough, Ont.; J. R. Dundas, Lindsay, Ont.; Robert Jaffray, Toronto, Ont.; Robert Cowans, Montreal; E. J. Halsey, H. Grissell, J. O. Surtees, London, England. The board re-elected George A. Cox President.

Mobile & Montgomery.—Mr. A. C. Richards, of New York, has been chosen President, in place of Gen. Daniel Tyler, resigned.

Mount Pleasant.—The directors of this new company are: I. A. Fancher, George L. Granger, D. H. Nelson, Mt. Pleasant, Mich.; H. C. Potter, S. C. Keeler, W. L. Webber, East Saginaw, Mich.; Jesse Hoyt, New York.

Northern (New Hampshire).—Josiah H. Benton, of Boston, has been chosen a director, in place of Onslow Stearns, deceased.

Pittsburgh & Castle Shannon.—At the annual meeting in Pittsburgh, Pa., Feb. 18, John Adams was chosen President, with the following directors: J. H. Ortmann, Fred. Moul, John Jahn, E. Rohrkaste, H. Sellers McKee, H. M. Rolfe, W. W. Martin, F. W. Steinart, Robert Boyd, Charles Kohlmeier.

Rockford, Milledgeville & Western.—The directors of this new company are: A. I. Enoch, Dr. R. P. Lane, Levi Rhodes, N. C. Thompson, Wm. Watson, Rockford, Ill.; G. M. Hunt, Polo, Ill.

Southern Kansas & Western.—The directors of this new company are: Wm. P. Hackney, N. Mamma, P. A. Wood, of Kansas; T. W. Peck, Chicago; Sidney Bartlett, John A. Burnham, H. H. Hunnewell, Charles Morrison, Nathaniel Thayer, Boston. Several of these are connected with the Leavenworth, Lawrence & Galveston.

Weston & West Fork.—Mr. Robert Randolph is Chief Engineer.

PERSONAL.

—The Grand Jury in St. Louis has found indictments against Chester L. White, formerly Auditor, and George H. Heafford, formerly General Passenger Agent of the Missouri Pacific, for embezzlement from the company. White is said to be now in Canada, and Heafford was lately in Canada.

—The Grand Jury at Troy, N. Y., has found indictments against D. Thomas Vail, President, and Daniel Robinson, Vice-President and Treasurer of the Troy & Boston Company, for conspiring to defraud the creditors of the Merchants' and Mechanics' Bank, of which they were also managers. The indictment against Robinson was afterward reconsidered.

—Mr. M. Stanton, General Superintendent of the Selma, Rome & Dalton road, whose serious injury by an accident on his road we noted last week, died in Selma, Ala., Feb. 22, from his injuries.

—Charles W. Angell, the dishonest Secretary of the Pullman Palace Car Company, who stole \$100,000 of its money, has been brought back to this country. He reached Philadelphia Feb. 23, and on the next day, after a short hearing in court, was delivered to detectives under a requisition from the Governor of Illinois, and at once started for Chicago.

—An Elmira (N. Y.) dispatch says that James C. Slocum, formerly a prominent railroad contractor, died last week in the Bryan County (O.) jail, where he was confined on a charge of obtaining money under false pretenses. He was at one time a division superintendent on the Hannibal & St. Joseph, and afterward on the Erie, and then engaged in building a road in Michigan. In 1872 he took the contract for the Rochester & State Line road and lost heavily, and has since been trying to retrieve himself.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending Dec. 31:	1878.	1877.	Inc. or Dec.	P. c.
Northern (Central).....	\$3,723,457	\$4,070,388	D. \$346,931	8.5
Net earnings.....	1,118,000	1,324,463	D. 205,563	15.5
Month of December:				
Alabama (Great South-ern).....	\$38,555	\$34,836	I. \$3,719	10.7
1879.....	1878.			
Month of January:				
Central of Iowa.....	\$58,061	\$67,111	D. 9,050	13.5
Net earnings.....	19,806	26,997	D. 7,191	20.6
Houston & Texas Central.....	260,746	239,202	I. 21,544	9.0
Net earnings.....	104,044	67,773	I. 36,271	53.5
Intercolonial.....	80,520	92,037	D. 2,517	2.7
Philadelphia & Erie.....	212,748	239,496	D. 7,748	3.5
Net earnings.....	64,817	81,975	D. 17,158	20.9
St. Louis & South-eastern.....	82,477	85,967	D. 3,490	4.1
Net earnings.....	17,217	13,767	I. 4,110	31.4
Wisconsin Valley.....	8,079	10,400	D. 1,721	16.5
Second week in February:				
Chicago, Mil. & St. Paul.....	\$109,000	\$170,656	D. \$61,656	36.1
Chi. & Eastern Illinois.....	16,092	13,929	I. 2,073	14.9
St. Louis, Iron Mt. & Southern.....	88,570	96,699	D. 8,129	8.4
Wabash.....	87,586	83,331	I. 4,255	5.1
Week ending Feb. 14:				
Great Western.....	\$98,084	\$92,017	I. \$6,067	6.6
Week ending Feb. 15:				
Grand Trunk.....	\$171,545	\$180,892	D. \$18,347	9.7

Grain Movement.

Receipts and shipments for the week ending Feb. 15 have been as follows for the past six years, in bushels:

Year.	Northwestern—Receipts.	Atlantic—Shipments.
1874.....	2,467,174	1,066,025
1875.....	1,331,829	782,016
1876.....	2,145,420	1,481,478
1877.....	1,419,072	1,111,317
1878.....	2,376,544	2,004,448
1879.....	2,850,118	1,639,882

The whole movement is very large, and the Atlantic receipts are the largest ever known in a week when navigation was closed.

Of the receipts at Atlantic ports for the week this year, 41.9 per cent. were at New York, 24 at Baltimore, 15.1 at Philadelphia, 10.5 at Boston, 6.6 at New Orleans, 1.8 at Portland, and 0.1 per cent. at Montreal. Baltimore receipts have not been so large since September last, and New York receipts are the largest since navigation closed and larger than in any week last winter. New Orleans receipts were also exceptionally large, but not so large as in the preceding week, when they equaled the aggregate receipts of the six previous weeks.

Illinois Central and Wabash Joint Business.

It is stated that the total earnings of the Illinois Central in 1878 upon freight business brought from St. Louis by the Wabash were \$15,639, and upon freight from its line to St. Louis by the Wabash, \$25,081, a total in both directions of \$40,720. All freight earnings on business between all stations, through and local, on both lines amounted only to \$158,043. Further, most of this business had to be taken at low rates on account of competition, so that the working expenses were probably at least 75 per cent., leaving the net earnings on the whole business less than \$40,000, the loss of which could not seriously affect the Central.

The Illinois Central people state that they were induced

to give up their line to St. Louis by the Vandalia Line by representations that the Wabash could control a large volume of traffic from St. Louis. The competition of the other lines, however, was so sharp that the Wabash was forced to agree to a pooling arrangement, under which it received only 20 per cent. of the St. Louis business.

Cotton.

Receipts at shipping ports for the week ending Feb. 21 and for the crop year from Sept. 1 to that date are reported as follows by the *Commercial and Financial Chronicle*:

	1879.	1878.	1877.	1876.	1875.
Week.....	134,328	109,730	88,068	109,870	78,075
Crop year.....	3,726,517	3,484,705	3,495,902	3,404,927	2,914,258

For the week 42 per cent. of the receipts were at New Orleans this year, against 41 per cent. in 1878, 45 in 1877, 49 in 1876, and 84 per cent. in 1875.

The exports for the same periods were:

	1879.	1878.	Increase.	P. c.
Week.....	126,225	122,897	3,328	2.6
Crop year.....	2,356,310	2,000,282	356,028	17.6

Of the exports this year 41 per cent. were from New Orleans.

Petroleum.

Stowell's *Petroleum Reporter* gives the production of the Pennsylvania oil wells for January as follows, in barrels:

	1879.	1878.	Increase.	P. c.
Production.....	1,346,671	1,203,296	143,375	11.9
Shipments.....	663,998	775,797	-111,799	-14.4
Stock on hand.....	5,207,972	3,555,342	1,652,630	46.5
No. of producing wells.....	10,482	8,616	1,866	21.7

Pittsburgh receipts of crude oil for January were 74,144 barrels; shipments of refined were equivalent to 46,956 barrels of crude.

Coal Movement.

Coal tonnages for the week ending Feb. 15 are reported as follows:

	1879.	1878.	Increase.	P. c.
Anthracite.....	380,801	128,849	251,952	195.6
Semi-bituminous.....	49,524	35,725	13,799	38.7
Bituminous, Pennsylvania.....	43,092	36,371	6,721	18.5
Coke, Pennsylvania.....	27,007			

The reported negotiations for a renewal of the anthracite combination in some form do not seem to have amounted to anything. A general weakening of prices is reported.

THE SCRAP HEAP.

Railroad Equipment Notes.

The three locomotive shops at Patterson, N. J., shipped 112 engines last year, against 18 in 1877, 29 in 1876, and 43 in 1875. This year 26 have been sent away up to Feb. 20, and all three of the shops have orders on hand.

The Chicago & Northwestern shops at Chicago are now working a force of 460 men in the car department. They have just completed four first-class passenger cars, 150 stock and 100 line cars, and are at work on one parlor car and 108 new box cars.

The Schenectady (N. Y.) Locomotive Works recently delivered 10 new freight engines to the New York Central & Hudson River road.

The Central Railroad, of New Jersey, is reported to have given out orders for 3,000 freight and coal cars, chiefly to shops in Pennsylvania.

The Missouri Car & Foundry Co., at its leased shops in Cambridge City, Ind., has recently finished 200 box cars for the Alabama Great Southern, 20 box cars for the Memphis, Paducah & Northern, and 100 coal cars for the Chicago, Pekin & Northwestern, and is building 50 box and 60 stock cars for the last-named road.

Iron and Manufacturing Notes.

The Edgar Thomson Steel Works, at Braddock, Pa., have orders enough to occupy them fully until July 1.

The Ohio Steel Bar Fence Co., at Cleveland, O., is making 10 tons of fence a day.

Brown, Bonnell & Co. are running their rolling-mill at Youngstown, O., full time on merchant-bar.

The Atlanta Rolling-Mill Co., at Atlanta, Ga., is running its mill double turn, except the rail train. Orders for bar-iron are behind for a month, and it seems impossible to catch up. The rail mill is running single turn on an order for 500 tons, and a contract has just been made with the Cherokee Iron Co. for 850 tons 35-lb. charcoal-iron head rails for the Marietta & North Georgia road. The workmen have accepted the reduction of wages.

W. B. Bement & Son, of Philadelphia, report business more active than for several years, with especial demand for large machine tools. They have several orders from France, England and other foreign countries.

The rolling mill at Parkersburg, Chester County, Pa., is in full operation.

Wm. S. Ellis, of Pottstown, Pa., has bought the Pottstown Car Works, and will use the buildings for an iron and brass foundry.

The Gautier Steel Co., at Johnstown, Pa., is running its new steel works double turn. The sheet mill was to be started up this week.

The Cherry Valley Iron Co., which owns a blast furnace and rolling mill at Leeton, O., has made an assignment for the benefit of its creditors.

The Empire Portable Forge Co., at Cohoes, N. Y., has recently made shipments to South America and Australia, and has a considerable trade with Canada, besides its home trade.

Mellert & Co., of Reading, Pa., have taken a contract to furnish 2,000 of the heavy cast-iron bases used as foundations for the columns of the Metropolitan Elevated road in New York.

The Indianapolis Rolling Mill is at work on a large order to re-roll iron rails for the Ohio & Mississippi road.

The Springfield (Ill.) Iron Co. is running its rail mill double turn on a heavy order for iron rails for the Northern Pacific road.

Bridge Notes.

The Clinton (Ia.) Bridge Co. has the contract for the trestle-work on 54 miles of the St. Louis, Kansas City & Northern's new line to Council Bluffs. The company is also building a new bridge over the Des Moines River at Ottumwa, Ia.

A. S. Hopkins, of St. Louis, has the contract for 30 Howe truss bridges on the new extension to Council Bluffs of the St. Louis, Kansas City & Northern road.

The Smith Bridge Co., of Toledo, O., has a contract for a highway bridge at Napoleon, O., to have three spans of 208 ft. each.

The Baltimore Bridge Co. is building a double-track iron bridge 218 ft. long over the Burnham Canal in Milwaukee, for the Chicago, Milwaukee & St. Paul road.

Wilkins, Post & Co., of Atlanta, Ga., and New York, have the contract for erecting the new bridge over the Savannah River, near Augusta, Ga., for the Port Royal & Augusta road.

Prices of Rails.

For steel rails the market continues strong, some of the mills having actually been obliged to decline orders, being al-

ready full of work for the season. A sale is reported of 10,000 tons for a Southern road at a price said to be \$44, delivered f. o. b. in New York. Philadelphia quotations have gone up a little, and are \$42 to \$45 per ton at mill. Pittsburgh prices reported are \$44 on cars at that place.

Iron rails are active and prices reported are \$32.50 to \$35, at mills. Sales are reported in Philadelphia of two lots, 1,000 tons each, 35-lb. section, at \$33.50 per ton at mill. A number of orders are reported on the market, and makers are somewhat particular about terms.

Old rails are quiet, and only sales of small lots are reported. Philadelphia quotations are \$20.50 to \$21 per ton for average quality; Pittsburgh, \$23.50 per ton delivered on cars.

At Pittsburgh steel rail ends are \$28 to \$32 per ton at mill, according to length, with fair demand.

Railroad spikes at Pittsburgh are quoted at 2½ cents per pound, an advance of one-quarter of a cent. The demand is active and most of the makers are full of work, one or two having been obliged to decline orders which they could not fill within the time required.

Spikes.

A man in a train on an Iowa road the other day handed the conductor a ticket he had bought at a scalper's office. It chanced, however, to have "corps" written across the face, and the conductor refused to pass him unless he would get into a box in the baggage car after the usual manner of corpses. He preferred to pay his fare.

A miner, with a bucket in his hand, was recently walking on a siding track near Nurevoh, Pennsylvania Railroad, when a train, which he supposed was on the main track, came up behind him and flung him over against the fence. He was uninjured, but his bucket was battered all out of shape, and as he picked himself up, he looked at the locomotive in a dazed sort of a way, and shouted: "What in are you doing on this track? Now, just look what you did to my bucket!"—*Altoona (Pa.) Tribune*.

In view of a recent family occurrence, Mr. Vanderbilt is reported to have expressed the opinion that it was a sight easier to manage half a dozen railroads than one love-struck young man.

When regulating sleeping-cars, the Legislature should provide that every berth shall be a lower berth in the middle of the car; that the ventilation shall suit everybody; that the cars shall never run off the track, and that the porter shall not put on any more airs than are absolutely necessary to convince the passengers that he owns the entire line, sleeping cars and all.—*Atchison (Kan.) Patriot*.

Special palace cars are all the rage now for traveling theatrical troupes, and the arrival of the advance agent at an interior town is generally followed in the local papers by a glowing description of the "magnificent palace on wheels built expressly for the use of Madame Blank."

How They Load Cattle.

At Sabetha, the train is halted alongside of a cattle train, while the other cattle, those in the passenger car, go up town and get dinner. After dinner the passengers solemnly contemplate the cattle, packed in at the rate of about three or four to the square inch.

"How on earth," asks a young lady, a very pretty young lady, who gets off at Seneca, "how on earth do they pack them in so close?"

"Why," asks a mild-looking young man, with tender blonde whiskers and wistful blue eyes; he is an escaped divinity student, just going out to take charge of a Baptist Church in Western Kansas. "Why," he says, "did you never see them load cattle into a car?"

"No," said the pretty Seneca girl, with a quick look of interest. "I never did; how do they do it?"

"Why," the divinity student remarked, slowly and very earnestly, "they drive them all in except one, a big fellow, with thin shoulders and broad quarters; they save him for a wedge and drive him in with a hammer."

Somehow or other it didn't look hardly fair to me; nobody protested against its admission, however, so it went on record, but the conversation went into utter bankruptcy right there, and the theological-looking young man was the only person in the car who looked supremely satisfied with himself.—*Correspondence Burlington Hawkeye*.

Settlement of Safety Valve Patent Litigation.

The Consolidated Safety Valve Co. has bought all the patents relating to steam safety valves owned by the Ashcroft Manufacturing Co. and George W. Richardson & Co., together with the stock in trade and good will of both concerns. All suits relating to the patents have been settled or withdrawn. The officers of the Consolidated Safety Valve Co. are Charles A. Moore, President and General Manager; Martin Luscomb, Secretary and Treasurer; George W. Richardson, Superintendent. Its offices and factory are at Nos. 51 and 53 Sudbury street, Boston. The patents owned have been in litigation for eight years past, and their validity is now fully established.

The Erie Canal as a Road-Bed.

State Engineer and Surveyor Seymour warns the railroads that if the Erie Canal should become so unprofitable as to compel its abandonment as a canal, it would probably result in the establishment of a new railroad between New York and Buffalo. He says:

"If our boatmen are ruined either by the competition of the Canada route, or by the railroad combinations it will make widespread disaster. Many thousands of our citizens engaged upon our canals will not only lose their property, but will be driven from their pursuits. Many warehouses and other structures will be made valueless, and our commercial cities will be injured to a degree which will send capital and enterprise into other states. The railroads also will suffer from these evils, and we cannot hope to replace the losses from the destruction of our water routes, for in many ways they have uses which railroads do not have. If the boatmen on the canals are broken down, the state will be forced to make use of its rights of way from the Hudson to Lake Erie and Lake Ontario. These will make better railroad routes than any now in use. They have ample width; their basins, etc., would furnish ground for all its needed structures. Their grades, with a few alterations, would be most favorable, and the routes would be through the centres of that close array of towns and cities which have grown up along this line.

"To save themselves, the roads now built must seek to save our canals and boatmen. In common with all who have learned the value of the water routes, I should deplore the necessity which would drive the state to give them up, with their advantages over railroads in many respects. It ought not to be forced into such action."

Accident Allowance and Superannuation Funds in England.

An English paper says: "Under their General Powers Act of 1878 the Great Eastern Railway Company have just established two funds for the benefit of their servants—an accident allowance fund and a superannuation fund—both of which are to be administered under the immediate supervision of the Chairman, Mr. Parkes. The object of the new institutions is to afford substantial compensation to any em-

ployed injured on duty, or to his relatives in case of death, and to provide adequate retiring allowances for old servants on arriving at the age of sixty years, or sooner, if necessary. The advantages of the accident allowance fund, which differs only from an ordinary benefit society in the smallness of its premiums and the liberality of its grants, may be secured by any servant by the payment of an insignificant weekly sum. Membership is not compulsory, but the directors have issued a warning notice that, as they consider it the duty of every man to provide against contingencies, it will be useless for any servant who may neglect to avail himself of the fund to look to the company for relief in the event of accident, or to expect that claims made by his representatives in case of death would be entertained. But it is the superannuation fund which is chiefly deserving of attention. Employees of all grades are eligible as members, but those whose appointments date from before the 1st inst. have the option of joining or not, as they think fit. For all new comers participation in the fund is obligatory, and they, with such of the older hands as may volunteer, will be required to submit to a weekly tax of 2½ per cent. on their salaries. The amount thus raised, together with an equal sum added by the directors, will be invested in the company's guaranteed bonds, and the proceeds devoted to the pensioning of old servants in accordance with the rules of the fund. These rules are to the effect that the continuance of the 2½ per cent. subscription for ten years shall entitle an officer to a retiring allowance equal to 25 per cent. of his average annual pay, and for forty years to one equal to 70 per cent., intermediate periods being calculated in proportion. In the event of quitting the service, a member will receive back the whole of his subscription, with the addition of 3 per cent. interest; and in case of death before the age fixed for superannuation, his heirs will be entitled to the return of his subscriptions, an equal amount added by the company, and 3 per cent. interest on the whole. The publication of this scheme, and the energetic steps taken to carry it into effect, have given great satisfaction to the Great Eastern employees, who are naturally pleased at being placed in a position to gain a stake, however small, in the prosperity of the company they serve."

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—This company has taken full possession of the Denver and Rio Grande Railway, and it will hereafter be known as the Denver & Rio Grande Division of the Atchison, Topeka & Santa Fe Rail road.

Atlantic & Great Western.—The report is renewed—and not now denied—that an agreement has been made for the lease of this road to the New York, Lake Erie & Western Company. The agreement is with the Reconstruction Trustees of the Atlantic & Great Western, and cannot be carried into effect until the foreclosure of that road is completed. The terms are said to be a guarantee by the Erie of \$300,000 interest on \$5,000,000 bonds, to be issued by the reorganized company to take up the Ohio first-mortgage bonds and the Receiver's debts and certificates; any surplus of net earnings over \$300,000 to be divided, two-thirds to the Atlantic & Great Western and one-third to the Erie. The particulars of the agreement are expected shortly.

Atlantic, Mississippi & Ohio.—Notice is given that the Receivers will pay, at their office, No. 23 Nassau street, New York, on March 1, the interest on the divisional bonds and funding notes, which became due Jan. 1.

Baltimore & Ohio.—Both houses of the West Virginia Legislature have passed the bill instructing the Attorney-General to begin proceedings in *quo warranto* for the forfeiture of this company's charter.

In consequence of the action of the Legislature, the company gave notice Feb. 20 that it is obliged to withdraw from all shippers of general merchandise, live stock, lumber, coal, ore, etc., in West Virginia, all special rates which have hitherto been given to enable shippers to reach markets at or beyond the terminus of the road. On and after March 1 the rates established by the new tariff will be applied without deviation or abatement to freight shipped over the line of the road to or from any station in West Virginia. As the proceedings of the Legislature seriously interfere with the arrangements made with connecting lines for the interchange of traffic, rates will not be quoted on freight shipped from stations in West Virginia to points beyond the terminus of the road, or *vice versa*. Freight charges on all property destined to points not on the line of the road must hereafter be prepaid.

Canada Southern.—Detroit papers note a rumor that this company has let a contract to W. L. Scott, of Erie, Pa., to build a tunnel under the Detroit River at Grosbe Point.

Canadian Pacific.—An Ottawa despatch reports contracts let to Morse, Nicholson & Marpole, of Toronto, for 67 miles of road from Winnipeg, Manitoba, eastward, and to Conway, Purcell, Ginty & Ryan for 118 miles from the end of the first contract to Thunder Bay.

Central, of Iowa.—Receiver Morrill's statement for January is as follows:

	1879.	1878.	1877.
Gross earnings.....	\$58,000.63	\$67,111.44	\$41,281.08
Working expenses.....	32,796.32	38,804.48	49,245.75
Renewals.....	5,458.29	1,305.00	2,315.34
New improvements.....	47.12	884.92	497.38
Old debts, prior to May 1, 1878.....	195.92		
Total payments.....	\$38,497.05	\$40,998.49	\$52,058.47
Balance.....	\$19,503.58	\$26,112.95	
Car-loads freight moved.....	2,197	2,280	1,521

The freight this year included 1,497 car-loads of coal, 389 of stock, 220 of grain, 29 of lumber and 62 of miscellaneous freight. Coal shows a large increase and grain a decrease.

Chattahoochee & Pensacola.—A bill is before the Florida Legislature to charter this company and grant it 10,000 acres of land per mile. The proposed line is an extension of the Jacksonville, Pensacola & Mobile from its terminus at the Apalachicola River westward about 150 miles to Pensacola, with branches to Freeport on Choctawhatchie Bay, to the Perdido River, and to the Alabama state line beyond the Escambia River.

Chicago, Burlington & Quincy.—General Baggage Agent Starring reports that during the year 947,365 pieces of baggage were handled. Amount paid for loss of and damage to baggage, \$30.40; amount received for extra baggage, \$14,615; number of cans of milk handled in baggage cars, 122,062; amount received for milk shipments, \$10,454; total receipts during the year 1878, \$33,036.16.

The Chariton & Indianola Branch is now completed to Indianola, Ia., 26 miles north by west from the junction with the main line at Chariton. Trains began to run through to Indianola last week, making connections there with the Chicago, Rock Island & Pacific branch to the same place.

Chicago & Illinois River.—The proceedings in bankruptcy against this company have been withdrawn by agreement of all parties and consent of the Court. This has

been done in consequence of an agreement by which the company is to pay off its debt gradually, the creditors allowing it time.

Chicago, Milwaukee & St. Paul.—It is stated that this company is preparing to extend its Iowa & Dakota Division next season from the present terminus at Patterson, Ia., westward 30 miles to the Big Sioux River. The terminus has not yet been decided on, and it is not impossible that a further extension of 45 miles to Yankton, Dak., may be built. The Hastings & Dakota Division is also to be extended from the present terminus at Montevideo, Minn., northwest some 70 miles to Big Lake, the limit of the land grant.

Chicago & Northwestern.—The matter of the application for a receiver for this section of the Chicago & Lake Huron line has been set for hearing before the United States Circuit Court at Detroit, March 17.

Concord.—Mr. John H. Pearson, a large stockholder, has filed a bill in the New Hampshire Supreme Court, asking that a number of the directors of this company be suspended or removed, that certain contracts be annulled, and the officers of the company be enjoined from making any further payments under them. He charges that unjust and fraudulent contracts have been made which cause a heavy annual loss to the company, and that payment has been made of old and fraudulent claims; also that liabilities have been incurred for other roads. The Concord stockholders have received regular 10 per cent. dividends, but Mr. Pearson thinks that they have still been robbed in a way that requires the summary interference of the courts.

Davenport & Northwestern.—At the time this road (the old Davenport & St. Paul) was sold and reorganized, suits were pending against it by the Delaware Construction Company, which built the road through Delaware County, Ia., and Birch, Lakin & Co., who graded it from the Delaware County line to Cresco. Both were appealed by the trustees and carried up to the United States Supreme Court, where they are still undecided. In spite of this, both parties have begun new suits in the Iowa courts to recover possession of the sections of the road on which they have liens.

Dayton & Southeastern.—Receiver Gimperling has obtained authority from the Court to arrange for the extension of the road from the present terminus at Musselman's, O., to Chillicothe. He is now securing the right of way and calling upon subscribers along the line of the extension to pay up their subscriptions, in order that he may let contracts to complete the grading.

Eastern.—This company purposes making a reduction of 10 per cent. in all salaries except the President's, and in the wages of all employees except those of the lowest grade, whose pay is already at a minimum rate. The reduction will probably take effect March 1.

Eastern Shore.—The second-mortgage bondholders, who recently bought this road at foreclosure sale, have decided to organize a new company and to issue \$140,450 common stock for three-fourths of the old second-mortgage bonds, and \$315,477 preferred stock, \$16,800 for the balance of the second-mortgage bonds, and \$268,677 for the overdue coupons on the first-mortgage bonds. The first mortgage for \$400,000 remains, the road having been sold subject to its lien.

Flint & Pere Marquette.—The Detroit Post and Tribune of Feb. 22, says: "We learn from a responsible source that by a recent negotiation with parties in this city, \$280,800 of the floating debt of the Flint & Pere Marquette Railway has been adjusted by the issue of bonds at 90 cents. By this and similar settlements, the floating debt of this company, which amounted to \$1,300,000 in the fall of 1875, and which grew out of the completion of the road to Lake Michigan, has been reduced to about \$390,000, and this is also in a way of being mainly extinguished during the coming season, so that we can consider the Flint & Pere Marquette Railway as being now in pretty good shape and nearly out of floating debt."

Helena, Alpine & Elk Mountain.—This company has been organized to build a railroad from Helena, in Lake County, Col., by way of Chalk Creek, Hot Springs, Alpine, Willow Creek and Elk Mountain to Gunnison City.

Indianapolis, Bloomington & Western.—It is stated that holders of \$5,121,000 out of the \$5,500,000 Extension bonds joined in the purchase of that part of the road. The bondholders' committee will soon hold a meeting to complete the details of the reorganization, and to decide what assessment it will be necessary for the bondholders to pay.

Indianapolis, Decatur & Springfield.—The Indianapolis News says: "The final location of this railroad, from this city to Guion, at which point it now connects from the West with the Logansport, Crawfordsville & Southwestern Railroad, a distance of 50 miles, has been made. From this city the road is an air line to North Salem, Hendricks County, where there is a bend to the west, and another air line to Russellville, across the northern tier of sections in the county. A slight detour to the south is then made to escape heavy grading, and Guion is reached. The road crosses the Louisville, New Albany & Chicago at a point four miles south of Ladoga, and six miles north of Bainbridge. This is a much cheaper line than any heretofore surveyed, and the prospects are good for an early completion of the road."

James River & Kanawha Canal.—The bill for the sale of this canal to the Richmond & Allegheny Railroad Company has passed the Virginia Legislature. The purchasing company intends to use the canal as a road-bed for its railroad from Richmond to the Chesapeake & Ohio at Clifton Forge.

Kansas Pacific.—The New York American Exchange, of Feb. 21, says: "The committee of the bondholders of the Denver Extension of the Kansas Pacific Railroad Company met yesterday to consider a proposition recently made by the Union Pacific management for the harmonizing of the two interests in the reorganization of the Kansas Pacific Company. The proposition has been favorably received by the committee, and although it was not definitely acted upon yesterday, the probabilities are that it will be accepted. A member of the committee said: 'The Union Pacific people propose to pay a proportion of the arrearages of interest on the Denver Extension mortgage, which will about equal \$150 per bond. In consideration of this the bondholders are to agree to reduce the rate of interest on their securities from 7 to 6 per cent. We are also to retain full possession of the Kansas Pacific road until the agreement is carried out, and the foreclosure is to proceed according to our original scheme of reorganization. The principal point in the proposition which the committee is considering is in regard to the security to be given by the Union Pacific for its faithful performance of the agreement. We may demand a deposit of money or of bonds, or we may be satisfied with security given in legal papers.'"

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia, Feb. 25, the stockholders voted to approve and confirm the modification of the lease of the Delaware Division Canal, as recently agreed on.

Lafayette, Muncie & Bloomington.—Receiver Chapman reports for January as follows:

Balance, Jan. 1.....\$16,168.83
Receipts.....38,207.07
Total.....\$54,375.90
Disbursements.....36,887.92

Balance, Feb. 1.....\$17,487.98

The receipts were \$1,319.15 greater than the payments for the month.

It is reported that the bondholders of the Eastern and Western divisions have come to an agreement, and that no opposition will be made to the sale of the whole road as one property. A joint purchasing committee will be appointed to buy it in for the bondholders.

Long Island.—The Court has granted permission to this company to execute a second mortgage on its property, to secure an issue of \$1,500,000 bonds. These bonds are to be used to fund the floating debt and enable the company to clear of arrears of interest and pay for certain branch lines.

Manistee & Reed City.—This company is organized to build a railroad from Manistee, Mich., on Lake Michigan, southeast about 50 miles to the Flint & Pere Marquette at Reed City. Manistee is about 25 miles north of Ludington, the lake terminus of the Flint & Pere Marquette, and at present has no railroad. It produces enormous quantities of lumber, nearly all of which goes by lake to Chicago.

Massachusetts Central.—Contractor N. C. Munson has let the grading of 12 miles, from Hudson, Mass., to Oakland, to Gardner & Flynn, who agree to put on a large force at once, and to complete the work by Sept. 1. The contractor, John Dow, who has the section from Stony Brook to Hudson, is pushing the work, and expects to have his section ready by May 1.

Metropolitan Elevated.—Trains have begun to run regularly over the new branch through 53rd street in New York from Sixth to Eighth avenue. Work on the line up Ninth avenue from 53d to 92d street is progressing well, in spite of delay from strikes and other causes. It is thought that this section will be ready for use about May 1.

On the new East Side line a number of men have already been set at work digging for the foundations of the posts, and making ready for the erection of the superstructure.

Midland, of Canada.—At the recent annual meeting it was reported that the gross earnings for 1878 were \$248,828.90, a decrease of \$14,805.40, or 5.6 per cent. from 1877.

The settlement with the bondholders provides for the canceling of all existing debts and the issue of \$2,625,000 new bonds, to bear 2½ per cent. interest for three years and 5 per cent. thereafter. Of these bonds \$435,000 are to be used in settlement of the floating debt. The bonded debt amounted to \$1,650,000 first-mortgage bonds and \$400,000 overdue coupons, and \$750,000 second-mortgage bonds.

Minnesota Railroad Bills.—Bills have passed the Minnesota Senate to enable the Chicago, Milwaukee & St. Paul to build a line from St. Paul to Minneapolis; the Chicago, St. Paul & Minneapolis to build a line from Hudson to Minneapolis; the Minneapolis & St. Louis road to extend its line to Minnetonka.

Missouri, Kansas & Texas.—The following instructions to agents and baggage masters have been issued:

"On and after Feb. 1, 1879, you will be allowed to check free 150 pounds of baggage on each first class, second class, emigrant, theatrical, mileage or other kind of ticket, and 75 pounds upon half-tickets. On baggage between local stations exceeding 150 pounds in weight, collect as per our local baggage tariff. On baggage checked to points beyond this railway exceeding 150 pounds in weight, collect for the excess, 15 per cent. of regular first class unlimited ticket fare per 100 pounds to point to which the baggage is checked.

"Local excess baggage (mileage and trip) tickets have noted on them the amount of baggage which the buyer is entitled to have checked. 1,000-mile commercial tickets issued prior to Feb. 1, 1879, will be allowed (until they expire) the amount of baggage named on them.

"All former orders that conflict with the above are hereby revoked."

Morgan's Louisiana & Texas.—A dispatch from Houston, Tex., Feb. 18, says: "A consolidation has been made by which the gap on the New Orleans road is to be closed in eighteen months. The contract, as signed, is that Morgan's Louisiana & Texas Railroad and Steamship Company is to build between Brashear and Vermilionville, and the Louisiana Western Railroad Company between Vermilionville and Orange; the Texas & New Orleans Railroad, the third party to the contract, to put the road between Houston and Orange in thorough repair, and to furnish all necessary rolling-stock. The contract requires that the road be completed in eighteen months, but J. T. Terry, President of the Texas & New Orleans road telegraphs from New York that the work is to be finished in eight months."

Mount Pleasant.—This company has been organized to build a narrow-gauge road from Mt. Pleasant, in Isabella County, Mich., to Coleman on the Flint & Pere Marquette road, a distance of 14 miles. Work is to be begun at once.

Naugatuck.—An attempt has been made recently to harmonize the differences between this company and the New Haven & Derby. A consolidation has been proposed, but it is apparently not favored by the New Haven & Derby directors. That company now has a bill before the Connecticut Legislature to oblige the Naugatuck to allow it to compete for the New Haven business coming down that road, instead of forcing it all to go by way of Bridgeport as at present.

New Hampshire Railroad Regulation.—Petitions are being extensively signed in New Hampshire asking the Legislature to pass a law limiting passenger fares on all roads to two cents a mile.

New York, Lake Erie & Western.—The ferry-boats of this company are now running to the new terminus and ferry-house in New York, at Warren street, just below the old one, at Chambers street. The new ferry-house will be much better than the old one when finished, but there is still much work to be done upon it.

A great freight traffic over the road is reported for the last month, so large that it requires much effort to prevent a blockade at the yards and division stations on the line. All the available motive power is in constant use, and more is needed.

Ohio & Mississippi.—The United States Circuit Court has declined to vacate the order enjoining the Receiver of the National Trust Company, of New York, from disposing of \$400,000 of this company's Springfield Division bonds held by him. The Court, however, directed the Receiver of the Trust Company to make a statement of its condition, so that the Court might determine whether any relief should be granted in the case.

Pennsylvania.—The company's statement for the month

of January shows, as compared with January, 1878, for all lines east of Pittsburgh and Erie:

An increase in gross earnings of.....\$147,128

An increase in expenses of.....5,796

Net increase.....\$141,332

All lines west of Pittsburgh in January show a surplus over all liabilities for the month of \$204,149, being a gain of \$17,022 over January, 1878.

The Philadelphia Times of Feb. 26 says: "It seems to be the impression of railroad men that a time is coming when the Baltimore & Ohio Railroad will make one grand effort to establish a direct connection with New York without using any of the lines of the Pennsylvania. Rumors of this kind have been rife for some time, but a strict reticence has been maintained by the heads of the several roads, so that nothing really definite has been learned as to the plans entertained or the time they are to be carried into execution. The Pennsylvania Railroad Company, however, has made a move which the managers of competitive lines are not slow to interpret as an expression of the great railroad company's position in the matter. George B. Roberts, the Second Vice-President of the Pennsylvania Railroad, speaking for the company, says this: 'There are so many clouds around that we propose to see where we stand.'

"The action of the Pennsylvania Railroad referred to has been to lock out of the Pennsylvania Railroad car yard, at West Philadelphia, all Philadelphia & Reading Railroad engines. To make the matter clear, it must first be understood that the line owned by the Junction Railroad Company extends from Belmont to Gray's Ferry, except that part within the limits of the Pennsylvania Railroad car yards from Thirty-fifth street to the north side of Market street, a distance of one and a half miles. The break in the Junction road the Pennsylvania Railroad Company own. The Reading Company's particular interest in using the Junction road is to reach their line from Gray's Ferry to Chester, over the tracks once used by the Philadelphia, Wilmington & Baltimore line before that company removed all its traffic to the Darby Extension.

"Vice-President Roberts, of the Pennsylvania Road, explains the present situation thus: 'For a long time the Pennsylvania Road has been permitting engines of the Reading Company to run over the tracks from Thirty-fifth street to the north side of Market street. All the traffic of the Junction Railroad is drawn by the engines of the Pennsylvania Road, with the exception of some of the coal cars of the Reading Company for the Chester Division, which the Reading engines hauled, and because we thought the practice of allowing this was dangerous and interfered with the safety of our traffic and the interests of our company, we ordered our superintendent not to allow the Reading engines to come on to our track. It was a step we have entertained taking for a long time. The Philadelphia, Wilmington & Baltimore engines do not run on our tracks, nor ours on theirs. The Reading Railroad will not allow our engines to run up to Nicetown, nor to move a foot upon their tracks. It was simply a matter of business right. We haul their cars as before. There has been no trouble, nor has there been any blockade. So far as we are concerned the order to keep Reading engines off our tracks has no relation to any possible efforts of other roads to get a connection to New York.'

Peoria & Springfield.—The Court has granted a final decree of foreclosure and sale against this road, which extends from Peoria, Ill., to Pekin, 9.2 miles, and has been used by the Indianapolis, Bloomington & Western for most of the time since it was built. The bonded debt is \$600,000.

Philadelphia & Atlantic City.—Argument was to be heard this week in the New Jersey Court of Chancery on the question of granting a decree of sale against this road for the benefit of the creditors.

It is said that the Camden & Atlantic Company has offered to lease the road under a perpetual lease. The offer is not to pay a yearly rental, but to give \$400,000 for the property, payable in five yearly installments. If the report is correct, this is much the best offer the creditors are likely to get for the road.

Philadelphia & Reading.—This company's statement for January, and the two months of its fiscal year ending Jan. 1, is as follows:

	January, 1879.	1878.	Two months, 1879.	1878.
Gross earnings:	\$900,482	\$610,769	\$1,711,373	\$1,817,204
Railroad traffic.....	\$2,580	993	7,777	17,137
Canal traffic.....	59,332	62,161	105,362	125,765
Richmond barges.....	20	57	14,359	17,878
Total R. R. Co.....	\$957,215	\$673,980	\$1,838,871	\$1,977,984
Coal & Iron Co.....	430,055	364,134	1,006,096	1,160,003
Total.....	\$1,387,270	\$1,038,114	\$2,844,967	\$3,137,987
Traffic:				
Passengers.....	532,858	541,600	1,008,462	1,063,623
Tons merchandise.....	262,391	246,315	500,508	477,502
Tons coal on R. R.....	451,698	231,324	824,868	879,053
Tons coal on colliers.....	34,361	49,622	78,293	97,466
Tons coal mined:				
By Coal & Iron Co.....	208,189	96,935	422,235	458,764
By tenants.....	84,388	36,121	142,073	145,086
Total.....	292,577	133,056	564,308	603,850

* Loss.

The January receipts of the Railroad Company show an increase of \$283,235, or 42.0 per cent., of the Coal & Iron Company an increase of \$65,921, or 18.1 per cent., making a total gain of \$349,156, or 33.6 per cent. This was due to the large increase in coal shipments for the month.

Pittsburgh & Lake Erie.—Regular passenger trains began to run over this road on Feb. 24. At present two through trains are run each way between Pittsburgh and Youngstown, and two local accommodation trains between Pittsburgh and Beaver Falls. The through trains make connections to and from Cleveland.

Portland & Ogdensburg, Vermont Division.—The bondholders' committee announce that they will appeal to the Supreme Court against the Chancellor's order allowing the Receivers to issue \$250,000 certificates to pay for repairs of the road. The committee, should the appeal fail, will take other proceedings to prevent the issue of the certificates.

Pullman Palace Car Co.—The Committee of the Illinois Legislature, which has been investigating the management of this company, has decided to report that it is not advisable at present to undertake any legislation for the purpose of reducing sleeping or palace-car charges.

Rome, Watertown & Ogdensburg.—This unfortunate road, hardly clear after the great storms of last month, is again blocked by snow. On Feb. 24 the movement of trains had to be entirely abandoned and snow-plows sent out to clear the road.

St. Louis, Kansas City & Northern.—Bids for the grading of the Council Bluffs & St. Louis road, this company's new Omaha line, have been accepted as follows, Patonsburg, Mo., being the starting point: James Raily & Co., St. Louis, 16 miles; Tuttle, Lawrence & Co., Decatur, Ill., 15 miles; E. Carney & Co., Chillicothe, Mo.,

8 miles; Neely & Co., Jackson, Tenn., 15 miles; total, 54 miles, leaving six miles unlet of the 60 advertised. The Howe-truss bridges, 30 in number, were let to H. S. Hopkins, of St. Louis, and the trestle-work to the Clinton Bridge Company, of Clinton, Ia.

St. Louis, Keokuk & Northwestern.—The Keokuk (Ia.) Gate City says that this company has completed arrangements for the extension of its road this year from Clarksville, Mo., southward to Dardenne, about 40 miles. It has also concluded an agreement for the use of the St. Louis, Kansas City & Northern track, from Dardenne to St. Louis, on favorable terms. Work on the extension is to be begun next month. In anticipation of an increase of business from this line, the company has ordered six new locomotives, six passenger and 200 freight cars.

St. Louis & Southeastern.—Auditor Young's report for January is as follows:

	St. Louis	Ky. Div.	Tenn. Div.	Entire - Line.
Gross earnings	\$44,928.16	\$26,533.93	\$11,014.46	\$82,476.55
Expenses	37,043.10	19,013.36	9,203.52	65,259.98
Net earnings	\$7,885.06	\$7,520.57	\$1,810.94	\$17,216.57
Per cent. of exps.	82.32	71.75	83.67	79.10

As compared with January, 1878, there was a decrease of \$3,490.33, or 4.1 per cent., in gross, and an increase of \$4,109.90, or 31.4 per cent., in net earnings.

Shenandoah Valley.—It is stated that the Cumberland Valley Company has agreed to build a branch from its leased Martinsburg & Potomac road at Bedington, W. Va., to Shepherdstown, in order to furnish a connection with this road.

Southeastern, of Canada.—It is reported that all or nearly all the securities of this company have been bought up by Bradley Barlow, of St. Albans, Vt., who is President of the company. The object of the purchase is not apparent at present.

Southern Kansas & Western.—This company has been organized to build a road from Thayer, Kan., on the Leavenworth, Lawrence & Galveston, westward some 200 miles through Elk, Cowley, Sumner, Harper and Barbour counties. The company promises to build 75 miles this year.

Wabash.—It is announced that the stockholders are to be asked to authorize the execution of a new general mortgage to secure an issue of \$2,000,000 bonds, to run 30 years, and bear 7 per cent. interest. The new bonds are to be offered to stockholders and others and the proceeds are to be used to provide for the so-called Seney bonds, which mature at the rate of \$200,000 a year for the next four years, and to pay for new equipment and improvements of the road.

Western, of North Carolina.—The bill has passed providing for the consolidation of this company with the Mount Airy Railroad Company, under the name of the Cape Fear & Yadkin Valley Railroad Company. The Western has 51 miles of road, from Fayetteville, N. C., to Egypt; the Mount Airy Company has no road. The bill further grants the consolidated company \$50,000 from the state treasury to aid in its extension, and the labor of 750 convicts free of charge.

Xenia & Kokomo.—An effort is to be made by this company to secure subscriptions and begin work. The company was organized last year to build a narrow-gauge road from Kokomo, Ind., east by north to Xenia in Miami County, about 15 miles.

Zanesville & Muskingum Valley.—It is proposed to build a narrow-gauge road from Zanesville, O., southward down the valley of the Muskingum to McConnellsville, about 20 miles. The project includes an extension hereafter from McConnellsville southeast to Marietta, some 35 miles further.

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Central, of New Jersey.

Receiver Lathrop issues the following brief statement for the year 1878, covering the whole system of 132 miles owned and 246 leased, 378 miles worked:

	1878.	1877.	Inc. or Dec.	P. c.
Passengers	\$1,573,015.10	\$1,530,639.74	I.	\$42,375.42 2.8
Merchandise	1,361,486.48	1,283,823.61	I.	77,662.87 6.0
Coal	2,504,681.53	2,806,804.32	D.	302,122.79 10.8
Miscellaneous	150,342.56	132,085.84	I.	18,256.72 13.8
Total	\$5,589,525.73	\$5,753,413.51	D.	\$163,887.78 2.8
Expenses	3,286,750.28	3,308,567.04	I.	18,180.24 0.6
Net earn.	\$2,302,769.45	\$2,444,846.47	D.	\$182,077.02 7.3
Gross earn. per mile	14,787.11	15,220.67	D.	433.56 2.8
Net earn. per mile	6,091.98	6,573.67	D.	481.69 7.3
Per cent. of exps.	58.80	56.81	I.	1.99 3.5

The Receiver says: "The road and equipment have been thoroughly maintained. All expenditures for the construction of new buildings, bridges, coal-trestles and piers, and for about 28 miles of new steel rails, laid during the year, as well as all legal and other disbursements, incident to the reorganization of the company, have been included in the above statement of expenses. No additions whatever have been made to construction accounts.

"By the united efforts and harmonious action of stockholders, bondholders and creditors, which the Receiver desires to acknowledge, the success of the reconstruction scheme has been assured. Ten per cent. on all the stock of the company has been paid by the stockholders. Two and one-half years' coupons have been funded on \$18,776,000 bonds out of a total of \$19,400,000, leaving only \$624,000 unassented.

"All the 'blanket' mortgage bonds, issued at the time of the Receiver's appointment, amounting to \$3,300,000, have been redeemed and canceled, and the mortgage satisfied of record.

"The resources of the company will be sufficient to meet current expenses, the installments on the extended loans, secured by collateral, and all interest payments on its bonded debt as they mature during the present year."

Northern Central.

This company owns a line from Baltimore northward to Sunbury, Pa., 138 miles, with an extension of 4 miles in Baltimore to the Canton wharves, and a branch from Relay House to Green Spring, Md., 9 miles, making 151 miles owned. It leases the Shamokin Valley & Pottsville road, from Sunbury to Mt. Carmel, Pa., 28 miles; the Williamsport & Elmira road, 78 miles; the Chemung road, 22 miles, and the Elmira, Jefferson & Canandaigua, 47 miles, the three last named forming a line from Williamsport, Pa., to Canandaigua, N. Y., 147 miles. Its trains use the Philadelphia & Erie track from Sunbury to Williamsport, 40 miles, to offset which the Philadelphia & Erie trains run on its track from Marysville to Sunbury, 47 miles. The total

mileage owned and leased is 326 miles, besides 40 miles used.

The report is for the year ending Dec. 31, 1878.

The general account is as follows:

Stock (\$38.091 per mile)	\$5,842,000.00
Maryland State loan, irredemable, 6 per cent.	1,500,000
Sinking fund 6 per cent. bonds	2,610,000
Mortgage 6 per cent. gold bonds	2,804,000
General mortgage, 6 per cent. bonds	4,473,000
Second general mortgage 5 per cent. bonds	3,000,000
Second general mortgage 6 per cent. bonds	1,000,000

Funded debt (\$101,940 per mile)	15,393,000.00
Bills and accounts payable, etc.	1,128,532.97

Total \$22,363,532.97

Road, real estate and equipment (\$115,209 per mile)	\$17,405,157.77
Stock of leased lines, cost	3,048,080.82
Cash, securities, materials, receivables	1,633,344.20
Profit and loss	276,350.18

Total \$22,363,532.97

The bonded debt has been reduced \$45,000 by the retirement of that amount of the general mortgage bonds.

The traffic for the year was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Passengers carried	1,380,393	1,479,092	D.	98,699 6.7
Green Spring Branch	24,132,837	25,726,798	D.	1,603,961 6.2
Tons freight carried	5,803,371	6,160,171	D.	356,800 5.8
Tonnage mileage	280,236,742	277,752,734	I.	2,484,008 0.9

The coal tonnage of the various divisions was as follows, tonnages, however, being duplicated to a considerable extent:

	1878.	1877.	Decrease.	P. c.
Main line	871,232	809,151	72,081	3.1
Shamokin Branch	5,302	5,748	446	0.8
Elmira & Wmsport	655,581	818,178	162,597	19.9
Division	463,029	613,426	150,397	24.5
Chemung Div.	437,086	520,520	83,434	18.1
Canandaigua Div.	275,061	224,068	50,993	22.7

The coal tonnage to Baltimore was 286,017 tons, a decrease of nearly 10 per cent. Concerning the coal traffic, the report says: "The decrease in the amount of anthracite coal carried is the result of the restriction upon the production effected by a general agreement between the anthracite coal-producing interests, to which the different coal companies on your road were parties. The result of this proved to be injurious to your company's interest, for while the tonnage was largely reduced, it was found impracticable to advance the rates of freight to any material extent; nor did the benefits derived through your investments in anthracite coal mines at all compensate for the loss of revenue from transportation.

"This decrease in the bituminous coal tonnage from the Erie Railway and Toga & Elmira State Line Railroad, destined to points north of Elmira, as compared with the previous year, was 223,416 net tons, the decrease in revenue from this source being \$52,922.92. This coal, instead of passing over your road to Watkins and Canandaigua, was shipped over the Syracuse, Geneva & Corning Railroad—a road built and controlled by parties who are also interested in the mining of the coal."

The average receipt and cost per passenger and per ton per mile were as follows, in cents:

	1878.	1877.	Receipt.	Cost.	Net.
Per passenger per mile	2.724	2.631	0.093	2.714	0.104
Per ton per mile	1.013	0.703	0.310	1.135	0.388

This shows a considerable decrease in the average freight rate. The average rate on the main line was 1.014 cents; the lowest rate was on the Chemung Division 0.730 cent, the net receipt on that division being only 0.046 cent per ton per mile.

The earnings for the year were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Passengers	\$6,700,81	\$6,988,171	D.	\$41,171.50 5.9
Freight	2,837,599.44	3,152,092.06	D.	315,093.22 10.0
Express and mail	109,427.40	115,469.34	D.	6,041.94 5.2
Miscellaneous	119,424.25	104,448.38	I.	15,375.87 14.8

Total	\$3,723,456.90	\$4,070,387.78	D.	\$346,930.88 8.5
Expenses	2,604,497.21	2,745,924.84	D.	141,427.63 5.2

Net earn. \$1,118,959.69

Gross earn. per mile 11,421.65

Net earn. per mile 3,432.30

Per cent. of exps. 69.95

67.46 I. 2.49 3.7

The gross earnings per mile of the various divisions were: Baltimore Division, \$18,277; Susquehanna Division, \$19,210; average, whole main line, \$18,595; Green Spring Branch, \$707; Shamokin Division, \$9,798; Elmira Division, \$5,446; Chemung Division, \$6,778; Canandaigua Division, \$5,447.

The income and profit and loss accounts were as follows:

Net earnings	\$1,118,959.69
Dividends and interest	211,179.67
Penn. R. R. contribution for operating Elmira, Chemung & Can. divisions	147,873.00
Royalty on coal mined, Shamokin Division	32,470.79

Total \$1,510,483.21

Interest on bonded debt \$894,330.00

Other interest, discount, ground rents, etc. 106,298.48

Rentals and interest on equipment, leased roads 484,357.33

Total \$1,485,585.81

Surplus for the year \$24,897.40

Royalty on coal, Shamokin Div. to Dec. 31, 1877 60,000.00

Dividend from Jay Cooke estate 500.00

Total \$26,397.40

Debit balance profit and loss, Dec. 31, 1877 308,413.58

Debit balance, Dec. 31, 1878 \$276,350.18

The report says: "The falling off in the revenue of the freight traffic of your several roads for the year 1878, as compared with the previous year, is mainly attributable to the decrease both in the anthracite and bituminous coal tonnage."

"During the year 1877 the quantity of grain carried over your road to Baltimore was 14,405,588 bushels. During the past year it was 14,812,066 bushels. This large increase made it necessary to provide additional storage and transfer facilities at Canton. Your board accordingly leased the coal pier, of which little use had previously been made, to the Baltimore Elevator Company, the lessees of your Canton Elevator, and entered into a contract with that company by which it agreed to construct an elevator on the pier of a capacity of 600,000 bushels. This elevator is now nearly completed, and will double the capacity for transferring and storing grain at Canton.

"A pier and warehouse for rolling freight, 500 feet long and 70 feet wide was constructed at Canton, adjacent to the elevator. Such a pier was much needed to secure your company's lines a share of the foreign trade of Baltimore, and while it was being constructed negotiations were

entered into which resulted in bringing to this pier a line of eight large freight steamers to ply between Baltimore and Liverpool, making weekly departures on and after March 1.

"Under the terms of the lease of the Elmira & Williamsport Railroad, it is made the duty of the Northern Central Railway Company to provide for certain bonds of that company, amounting to \$1,000,000, bearing interest at 7 per cent. per annum, when they mature, on the first day of January, 1880. Arrangements have recently been made under which the bonds will be purchased at par and accrued interest on and after the 15th day of March, 1879, from such of the holders as may desire to sell; or the holders, if they so desire, may have the privilege of extending the same for a period of 30 years from maturity at 6 per cent. per annum, secured by the same mortgage and under the same guarantees, provided the option of extending is exercised before the first day of May, 1879.

"The following were the results for the year 1878 of the Mineral Railroad & Mining Company:

Receipts from all sources \$857,047.39

Expenses 795,348.15

Net earnings \$61,699.24

"The production of coal was 285,775 tons. This company, in which your company holds two-thirds of the shares, declared a dividend of 6 per cent. out of its earnings, the amount received by your company being \$40,000."

"In February, 1879, your board created an insurance fund for the better protection of your property from loss by fire. The plan adopted was to pay into the fund each year an amount equal to 1½ per cent. upon the estimated value of the property which it was thought necessary to insure, the amounts thus paid to the fund being charged to the operating expenses of the road. In addition to the amounts so paid in, the amount received from the Baltimore Elevator Company for the insurance of the Canton Elevator, in accordance with the lease, is also placed in the insurance fund. Out of this fund are paid the premiums to regular insurance companies on such properties as it is considered expedient to insure outside of the fund, and the amount remaining there-in after such payments is vested in the bonds of the company to provide for any losses that may occur.

"By reference to the Treasurer's statement of the operations of this fund, from its creation to Dec. 31, 1878, it will be seen that after paying all premiums in insurance companies the fund has a credit of \$33,173.89, of which \$4,683.56 is in cash and \$28,490.33 is invested in the bonds of the company."

"Your board takes pleasure in reporting that your property is in excellent condition, steady improvement having been made in all the departments of the service for several years past. There are now in the tracks of the company's various roads 27,944 tons of steel rails, leaving 8,298 tons of iron rails in the main tracks. The motive power and rolling stock have also been kept in excellent condition."

Kansas Pacific.

The Receivers make the following brief statement of the earnings and expenses for the year 1878:

	1st mort. div.	2d mort. div.	3d mort. div.	4th mort. div.
Gross earnings	\$1,602,610	\$1,180,267	\$634,518	\$103,427
Expenses	703,801	728,425	633,974	84,558
Net earnings	\$898,809	\$451,842	\$542	\$18,869
Gross earn. per mile	12,086	4,647	2,500	3,042
Net " " "	7,050	1,770	2	584
Per cent. of exps.	41.60	61.72	99.91	81.76

The first mortgage division includes the main line from Kansas City to the 140th mile-post; the second from the 140th to the 394th mile-post; the third from the 394th mile-post to Denver; the fourth, the Leavenworth Branch. The condensed statement for the whole line is as follows:

	1878.	1877.	Increase.	P. c.
Ordinary business and miscellaneous	\$3,370,387			
Government business	135,299			
Company business	68,538			

Total \$3,610,224

Expenses 2,150,790

Net earnings \$1,459,434

Gross earn. per mile 5,364

Net " " " 2,160

Per cent. of exps. 59.57

58.36 1.21 2.1

The net earnings in 1878 were nearly 6½ per cent. on the total bonded debt, not including the government lien.

Charlotte, Columbia & Augusta.

This company owns a line from Charlotte, N. C., southward to Columbia, S. C., and thence southwest to Augusta, Ga., 195 miles in all. It has been for some years under a management which worked it as a feeder to the Coast Line, carrying traffic from both ends of the road to Columbia, where it was delivered to the Wilmington, Columbia & Augusta; but last year a controlling interest was bought by the Richmond & Danville Company, which will naturally carry the business from the whole line through to Charlotte. The change, however, only came near the close of the year covered by the latest report, which is that ending Sept. 30, 1878.

The equipment consists of 22 engines; 2 sleeping, 15 passenger and 8 baggage cars; 144 box, 9 stock, 56 flat and 9 caboose cars. One engine, one baggage car and 1 caboose were condemned during the year.

The general account is as follows:

Stock (\$13.221 per mile)	\$2,578,000.00
Bonds (\$12.875 per mile)	2,510,547.62
Bills, accounts and balance payable	186,855.23
Profit and loss	192,880.16

Total \$5,468,283.01

Road and property (\$26,636 per mile) \$6,163,985.31

Stocks and bonds 5,073,522.93

Cash, materials and receivables 79,565.08

Total \$11,317,073.32

The bonds consist of \$2,000,000 first mortgage, \$500,000 second mortgage, \$10,000 old Charlotte & South Carolina and \$547.62 fractional bonds. There was no change in stock or bonds during the year.

The traffic for the year was as follows:

	1877-78.	1878-77.	Inc. or Dec.	P. c.
Train mileage	246,737	151,067	I.	95,670 63.3
Passenger	133,745	150,887	D.	17,142 16.3
Freight	34,871	60,574	D.	25,703 42.4
Service and switching	415,353	371,528	I.	43,825 11.8

Total 415,353

Cost of engine service per mile 11.34 cts.

Passengers carried 58,570

Tons freight carried 97,948

Bales cotton carried 90,315

132,110 D. 35,795 27.1

The increase in train mileage was due to the running of an extra passenger train for several months. The increase in passengers was wholly local, through travel showing a decrease. The loss in freight was entirely in cotton, chiefly

in shipments from Augusta and beyond, and merchandise freights showed an increase.

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passengers.....	\$140,220.23	\$153,760.37	D. \$13,540.14	8.8
Freight.....	250,613.06	284,216.27	D. 33,603.21	11.8
Mails, express, etc.	50,523.74	59,180.28	D. 8,656.54	14.0
Total.....	\$441,357.03	\$497,156.92	D. \$55,799.89	11.2
Expenses.....	272,778.84	294,068.14	D. 21,289.30	7.4
Net earnings.....	\$168,578.19	\$202,488.78	D. \$33,910.59	16.7
Gross earnings per mile.....	2,263.37	2,549.52	D. 286.15	11.2
Net earnings per mile.....	864.50	1,038.49	D. 173.99	16.7
Per cent. of exps.....	61.80	59.27	L. 2.53	4.3

The income account for the year was as follows:

Net earnings.....	\$168,578.19
Interest and taxes.....	213,911.12
Deficit for the year.....	\$44,432.93
Old accounts, judgments, etc., and iron rails used in previous years.....	73,808.16
Total.....	\$118,241.00
Balance from previous year.....	311,121.25
Balance at close of year.....	\$192,880.16

During the year 100 tons new iron rails, 58,411 new ties, 4,070 stringers and 208,197 feet lumber were used in renewals. Several new sidings were built, 22 miles of road ballasted and 36 miles ditched. A culvert near Columbia was replaced by a trestle, the culvert having been ordered by Court to be lowered. Renewals were rather below the average.

The increase in train mileage prevented a reduction of expenses equal to that in receipts. In freight there was an increase in local cotton; the Cheraw & Chester road brings some new traffic, and a cessation of local competition with the Chester & Lenoir is looked for. It is hoped that the decrease in earnings, which has been continuous for several years, may be arrested by a slight improvement in rates and by a management which will bring through traffic over the whole length of the road, instead of confining four-sevenths of it to a purely local business.

Hartford, Providence & Fishkill.

This road, for many years operated by the trustees for the bondholders, consists of a line from Providence, R. I., to Waterbury, Conn., 122.365 miles, with a freight branch 0.822 miles long in Providence. The Pawtucket Valley road, 3 miles; the South Manchester road, 2.25 miles, and the Rockville road, 4.5 miles, have been worked under lease, making 123.187 miles owned, and 132.937 miles worked. The figures herewith are from the report to the Connecticut Railroad Commission for the year ending Sept. 30, 1878.

The equipment consists of 33 engines; 37 passenger and 17 baggage and mail cars; 344 freight and 72 service cars.

The trustees state assets and liabilities as follows:

Bonds (\$10.711 per mile).....	\$2,055,500.00
Floating liabilities and loans.....	349,251.44
Profit and loss.....	20,573.13
Total.....	\$2,425,324.57
Road, etc. (\$18,506 per mile).....	\$2,276,403.98
Materials, fuel, etc.....	147,342.82
Accounts.....	11,487.77
Total.....	2,425,324.57

The stock paid in was \$2,037,939.98, which is not included in the above account.

The work done for the year was as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Train mileage.....	577,955	612,153	D. 34,198	5.6
Passengers carried.....	1,192,082	1,247,732	D. 55,650	4.4
Passenger mileage.....	14,191,850	15,476,226	D. 1,284,376	8.3
Tons freight carried.....	283,114	290,681	D. 7,567	4.6
Tonnage mileage.....	7,299,987	7,853,814	D. 553,827	7.1
Average rate:				
Per passenger per mile.....	2.75 cts.	2.67 cts.	L. 0.08 ct.	3.0
Per ton per mile.....	5.00 "	5.00 "		

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passengers.....	\$391,335.57	\$414,061.56	D. \$22,725.99	5.5
Freight.....	383,412.39	418,328.29	D. 34,915.90	8.3
Express, mail, etc.....	63,390.30	65,255.11	D. 1,864.81	2.9
Total.....	\$838,138.26	\$897,644.96	D. \$59,506.70	6.6
Expenses.....	652,390.98	681,706.11	D. 29,315.13	4.3
Net earnings.....	\$185,738.28	\$215,938.85	D. \$30,200.57	14.0
Gross earnings per mile.....	6,301.79	6,749.21	D. 447.42	6.6
Net earnings per mile.....	1,390.53	1,623.60	D. 233.07	14.0
Per cent. of exps.....	77.84	75.94	L. 1.90	2.5

The income account is as follows:

Gross earnings.....	\$838,138.26
Accounts payable.....	28,506.20
Total.....	\$866,644.46
Expenses.....	\$652,390.98
Interest, taxes, etc.....	180,504.57
New work, including Hartford tunnel.....	24,679.91
Total.....	860,644.46

Since the close of the fiscal year the New York & New England Company has paid off the bonded debt and assumed possession of the road under the old contract. It will be hereafter a part of that road. The intention is to extend it from Waterbury to the Hudson River at Fishkill, N. Y., on the line partly graded several years ago.

New York & New England.

This company owns a line from Boston to Willimantic, Conn., 85.75 miles; the Dedham Branch, 2 miles; the Southbridge Branch, 17.50 miles; and the Woonsocket Division, from Brookline, Mass., to Woonsocket, R. I., 33.75, making 139 miles owned. It leases the Rhode Island & Massachusetts road, from Franklin, Mass., to Valley Falls, R. I., 13 miles, making 152 miles worked. It also operates the Norwich & Worcester road, but the earnings of that line are reported separately. The present report is for the year ending Sept. 30, 1878.

The company is a reorganization of the old Boston, Hartford & Erie, sold under foreclosure of the Berdell mortgage. Since the close of the year it has acquired possession of the Hartford, Providence & Fishkill road under an old contract and by payment of its bonds.

The equipment consists of 36 engines; 65 passenger and 13 baggage cars; 165 box, 154 flat and 163 coal and gravel cars.

The general account is as follows:

Stock (\$143,885 per mile).....	\$20,000,000.00
Mortgage bonds and notes (\$8.482 per mile).....	901,000.00
Notes, accounts and balances payable.....	359,363.09
October account.....	79,712.74
Profit and loss.....	201,721.43
Total.....	\$21,541,797.26
Road, etc. (\$154,097 per mile).....	\$21,419,500.06
Cash, balances and materials.....	122,297.20
Total.....	21,541,797.26

Property account was increased \$293,316.70, chiefly for

Boston wharf property and new equipment. Since the close of the year some \$3,000,000 bonds have been sold, the proceeds being used in securing possession of the Hartford, Providence & Fishkill road. Of the \$20,000,000 Berdell bonds \$5,817,000 have been exchanged for stock.

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passengers.....	\$428,932.88	\$421,147.08	I. \$7,785.80	1.8
Freight.....	505,809.19	477,369.77	I. 28,439.42	6.0
Other sources.....	91,193.27	111,789.99	D. 20,596.72	18.4
Total.....	\$1,025,935.34	\$1,010,306.84	I. \$15,628.50	1.5
Expenses.....	797,565.86	770,684.70	I. 26,881.16	3.5
Net earnings.....	\$228,369.48	\$239,622.11	D. \$11,252.63	4.7
Gross earnings per mile.....	6,749.58	7,267.04	D. 517.46	7.1
Net earnings per mile.....	1,502.43	1,723.74	D. 221.31	12.8
Per cent. of exps.....	77.73	76.28	L. 1.45	1.9

The income account was as follows:

Net earnings.....	\$228,369.48
Interest, discount, taxes, etc.....	\$97,386.88
Rents.....	61,833.84
Total.....	387,590.20
Surplus for the year.....	\$60,148.76
Surplus Sept. 30, 1877.....	132,572.67
Surplus Sept. 30, 1878.....	\$201,721.43

The Norwich & Worcester lease resulted last year in a loss of about \$6,000, against a profit of \$35,552 the previous year, owing chiefly to competition on New York and Boston

business. Efforts are being made to secure a modification of the lease.

Renewals included 1,001 tons steel and 348 tons iron rails; 11 bridges were rebuilt. Expenses were increased by lack of equipment and other facilities, but the purchase of the Hartford, Providence & Fishkill has supplied additional equipment and shop facilities.

The line to Providence furnished by the leased Rhode Island & Massachusetts road has done well and will be of much service hereafter.

The report accounts at length the attempt to secure aid from the state of Massachusetts and its failure, and the subsequent negotiation of bonds. Of the Boston terminal facilities it says: "The purchase of Drake's wharf has given us greatly extended yard accommodation on Federal street, adjoining our passenger and freight depot; and a temporary arrangement has been effected with the land commissioners of the commonwealth for the use of twenty-five acres of land belonging to the state, with convenient docks, which give us immediate communication with the ocean and coasting traffic, which has been so profitable to other railroads, but from which we have been hitherto debarred. We have also purchased, at a small fraction of their cost, the land and buildings adjoining our track at Readville, with the steam-engine, belting and other fixtures, formerly belonging to the New England Iron Company, and admirably adapted to immediate use for machine shops. A convenient round-house is now in process of construction on land of the Boston Wharf Company, which we hold under a contract for a future purchase; and the corporation will soon be in condition to conduct its business with the appointments of a first-class road."

LOCOMOTIVE RETURNS, NOVEMBER, 1878.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

NAME OF ROAD.	Number of miles operated.	Number of Locomotives in service.	MILEAGE.		MILES RUN TO		Average No. of freight cars hauled.	Average cost per freight car per mile, cents.	COST PER MILE IN CENTS FOR						AVERAGE COST OF		
			Total.	Average per Engine.	Coal.	Wood.			Point of Oil.	Repairs.	Fuel.	Stores.	Miscellaneous.	Engineers, firemen and wipers.	Total.	Coal per ton.	Wood per cord.
Allegheny Val., River Div.*	139	40	87,356	2,183.38	73		26.17	21.90	0.621	3.48	3.21	0.47		6.15	13.31		
Low Gr. Div.*	120	19	35,213	1,853.32	27		21.09	21.50	0.653	2.37	3.44	0.58		5.92	12.31		
Atlantic & Great Western, 1st & 2d Divs.	226	83	225,750	2,720.37	58		18.15	16.50		3.52	5.33	0.49	0.62	5.87	15.83	1.90	2.86
3d & 4th Divs.	197	50	159,859	3,197.32	03		31.41	15.20		4.41	5.28	0.31	0.57	5.38	15.95	1.59	2.86
Mahoning Div.	98	51	98,967	1,941.39	60		24.90	17.30		3.32	4.02	0.39	0.58	5.46	14.37	1.71	2.86
Atlantic & Gulf.	343	22	59,478	2,703.		47.35	20.75			4.00	3.68	0.29		7.21	15.21		1.74
Camden & Atlantic.	97	9	19,798	2,199.53	80		14.50	9.70		3.95	7.10	0.82	0.79	7.21	24.61		3.82
California Pacific.	178	12	33,475	2,790.44	17		18.49			2.75	13.41	0.45					5.75
Gen. Pac., Western Div.*	128	20	61,891	2,380.44	35		14.51			7.43	13.20	0.53	0.38	8.62	30.16		5.75
Northern & San Pablo & T.	158	32	89,106	2,691.38	83		15.58			8.69	15.00	0.48	0.37	6.67	31.30		5.75
Visalia Div.*	157	10	24,947	2,495.46	20		15.46			9.65	12.13	0.49	0.11	7.03	29.41		5.75
Tulare Div.*	171	9	24,276	2,697.39	87		13.38			4.85	14.63	0.56	0.34	7.37	27.75		5.75
Los Angeles, San Diego, Yuma & Wilmington Divs.*	413	21	58,575	2,789.58	00		14.95			5.76	10.10	0.50	0.28	7.15	23.70		5.75
Sacramento Div.*	120	35	86,978	2,485.		25.49	16.73			5.82	22.55	0.47	0.37	9.22	38.43		5.75
Oregon Div.*	132	9	22,169	2,463.33	82		19.19			8.17	19.06	0.43	0.11	8.00	35.83		5.75
Truckee Div.*	200	19	72,952	2,800.34	32		27.53	15.75		3.79	18.07	0.47	0.33	7.94	31.20		5.75
Humboldt Div.*	200	19	85,707	2,637.46	02		21.17			7.41	14.38	0.34	0.37	7.53	30.03		5.75
Salt Lake Div.*	219	30	79,725	2,740.33	24		14.12			4.61	17.50	0.56	0.32	7.82	30.81		5.75
Stockton & Copperopolis.	49	3	4,928	1,543.37	20		10.79			6.26	17.40	0.72	1.22	8.00	34.29		5.75
Chicago & Eastern Illinois.	153	38	83,124	2,669.39	22		41.78			3.54	3.28	0.33		5.70	12.85		5.75
Cin., Lafayette & Chicago.	75	10	96,951	2,695.37	30		14.51			2.42	6.12	0.34		6.35	15.23	2.25	
Cleve., Col., Cin. & Ind., Columbus Div.	128	58															
Indianapolis Div.	203	63															
Cincinnati Div.	140	36															
Cleveland & Mahoning Valley.	41	6	13,084	2,181.37	17		23.20	10.80		7.00	3.58	0.25	1.31	6.10	18.28	1.18	2.65
Cleveland & Pittsburgh.*	78	17	173,576	2,255.42	70		18.70	18.70	0.666	2.96	2.76	0.43	2.56	6.26	14.97	1.05	3.90
Cleveland, Tuscarawas Valley & Wheeling.	101	15	38,975	2,508.29	89		17.65			4.82	1.61	0.40		5.69	12.61		
Del., Lackawanna & Western.	80	21	47,803	2,276.			33.27			2.22		0.55		4.55	7.32		
Bloomburg Div.*	98	28	53,578	1,913.37	63		18.81	18.10	0.925	2.19	3.51	0.30	1.30	6.12	13.51	1.60	1.61
Erie & Pittsburgh.*	42	8	84,835	2,620.38	00		21.20										
Grand Trunk, Portland Div.	57	15	15,180	2,723.			20.60										
Eastern Div.	8	20	20,452	2,557.47	35		21.30										
Champlain Div.	134	37	373,624	2,788.37	34		23.00										
Central Div.	85	20	230,559	2,818.41	35		19.80										
Western Div.	20	55	55,950	2,798.48	39		18.20										
Buffalo Div.	16	33	33,518	3,345.35	40		23.80										
Green Bay & Minnesota.	240	13	29,505	2,269.41	00	47.75	22.08	16.13		2.03	5.75	0.28	0.04	4.27	12.37	3.80	2.95
Houston & Texas Central.*	498	50	166,133	2,810.41	70	38.20	10.00			3.80	7.24	0.44	0.92	6.72	10.15	3.05	2.68
Ill. Cen., Chicago Div.	253	60	155,797	2,937.32	30		15.74	20.08		2.92	5.76	0.30		6.00	19.99	1.75	2.40
*South Div.	227	59	70,167	2,629.37	48		15.94			3.20	4.94	0.29		5.71	14.15	1.75	2.40
Springfield Div.	231	36	88,870	2,469.32	30		15.43	13.38		4.10	7.40	0.30		5.75	15.85	1.75	4.29
Iowa Div.	110	10	25,168	2,517.35	00		23.31	13.97		2.74	4.25	0.26		5.92	18.78	1.45	2.65
Indiana Div.	401	42	100,500	2,393.29	80		10.57	12.50		3.17	8.98	0.29		5.83	18.28	2.60	4.90
Indianapolis, Cin. & Lafayette	226	43	104,492	2,488.39	19	21.10				3.50	5.39	0.25		5.78	14.92		
Jeff.ville, Madison & Ind.*	226	44	99,708	2,266.40	40	23.63	29.01	21.18	1.270	4.51	6.43	0.42	2.16	5.41	18.93	2.40	2.20
Kansas City, St. Jo. & Council Bluffs.*	271	32	104,123	3,254.52	00	30.90				3.30	5.50	0.30		6.50	15.60	2.15	3.60
L. S. & M. S., Buffalo Div.*	89	18	182,653	2,655.36	00	47.36	34.29			3.34	8.07	0.30		5.80	17.53	2.85	5.90
St. Louis & S. W. Ry.	113	2	1,060,320	3,678.37	04	67.81	37.04			3.26	8.00	0.30		5.90	17.26	2.50	5.43
Toledo Division.	3	85	136,900	1,610.26	29		22.21			5.43	10.90	0.35		5.57	23.25		4.08
Mich. Southern Division.	280	380	380,133	1,827.38	09	59.33	23.40			4.60	8.51	0.27		5.64	19.13	3.55	6.03
Little Rock & Fort Smith.	168	10	30,925	3,093.		55.67	18.31			0.55	3.44	0.33		3.98	4.30		2.00
Louisville, Cin. & Lexington.	213	10	80,953		42.70		12.38			3.49	5.61	0.52	2.00	5.97	17.59	2.00	2.75
Louisville & Nash., First Div.*	332	65	124,574	1,916.23	30		14.18	18.05	1.360	4.01	8.91	0.47	1.45	6.89	21.73	2.03	2.40
Second Div.*	200	39	90,615	2,327.42			13.74	16.30	1.400	4.15	7.37	0.48	1.88	6.14	20.02	1.98	2.65
Memph. Div.	131	18	44,690	2,450.27	46		13.11	16.60	1.810	4.85	11.91	0.46	1.72	5.90	24.94	3.24	2.30
Philadelphia & Decatur Div.*	132	24	42,616	1,888.29	47		14.56	18.92	1.300	2.32	7.49	0.45	1.61	6.52	18.33	1.92	3.08
S. & N. Alabama R. R.*	180	32	71,403	2,331.30	30		12.43	15.32	1.450	6.03	7.87	0.67	1.13	6.30	21.94	2.25	2.42
Marq., Hought. & Ontonagon	88	21	18,170	8,865.47	37		26.11	16.72		0.67	8.90	0.52		6.29	16.38	4.00	
Northern Central, Elmira & Canandaigua Divs.	147	45	89,754	1,905.25	77		20.00			5.78	6.44	0.57		5.80	18.50	1.60	2.50
Penn., New York Div.*	120	130	205,291	2,156.30	84		11.04			4.80	9.90	0.70		15.40	30.00	4.08	
Amboy Div.*	154	41	78,972	1,925.56	19		17.39			2.30	5.40	0.40		8.10	3.00	4.58	
Belvidere Div.*	103	56	57,748	1,604.30	51		15.48			5.90	10.00	0.60		16.50	30.00	4.57	
Philadelphia Div.*	108	18	42,616	3,073.55	00		14.56			4.18	5.19	0.27		11.50	12.70	1.30	2.64
Middle Div.*	142	94	296,252	3,152.35	69		17.42			6.20	8.80	0.50		11.50			
Pittsb. Div.*	221	147	439,881	2,992.26	34		11.82			3.00	4.70	0.50		8.20	12.00	2.64	
Tyrone Div.*	107	28	54,698	1,932.22	05		19.38			4.50	5.00	0.50		10.50	1.20	2.64	
West Penn. Div.*	104	24	49,344	2,056.37	08		37.04			2.00	3.30	0.30		5.60	12.00	2.64	
Lewistown Div.*	56	5	11,252	2,250.30	05		17.18			0.80	4.10	0.40		5.30	1.20	2.77	
Bedford Div.*	57	5	10,584	1,217.25	64		21.37			1.00	4.70	0.40		6.10	1.90	2.77	
Penn., Fort Wayne & Chicago, Ellettsburg Div.*	371	151	395,841	2,423.40	55		22.39	16.70	0.742	1.96	3.40	0.38	1.24	6.11	13.09	1.38	1.38
Western Div.*	280	90	290,983	2,939.37	80		17.20	22.30	0.835	4.35	3.95	0.29	2.38	5.86	16.83	1.48	1.48
Pitts., Cin. & St. Louis, Little Miami Div.*	197	38	98,902	2,603.39	19		13.07	18.40	0.873	4.17	5.47	0.52	3.12	5.65	18.93	2.10	2.00
P. C. & St. L. Div.*	224	94	241,410	2,568.27	44		19.87	19.41	0.820	5.33	3.12	0.38	2.16	5.93	16.02	0.80	2.30
St. Louis, Iron Mt. & So., Arkansas Div.	328	38	112,920	2,972.		44.70	16.90			3.55	5.57	0.43		6.32	15.87		2.50
St. Louis & San Francisco.	335	38	75,975		33.80		14.60			3.54	6.00	0.35		5.58	15.48	2.05	1.80
St. Louis & S. E., St. L. Div.	230	18	35,957		42.70		10.40			4.18	5.50	0.27		5.50	12.45		1.80
Nashville Div.	145	10	61,157		30.00		16.60			3.93	2.42	0.29		10.10	12.74	0.60	
Wabash, Eastern Div.*	250	101	256,481	2,540.35	91		10.76	24.45	0.780	4.93	4.87	0.39		7.08	17.27	1.75	
Western Div.*	441	71	202,043	2,448.30	00		13.00	21.43	0.940	4.28	3.38	0.30		6.63	15.59	1.33	
West Jersey.*	128	16	32,932	2,858.48	96		20.92			0.20	7.80	0.50		8.50	3.80	3.75	